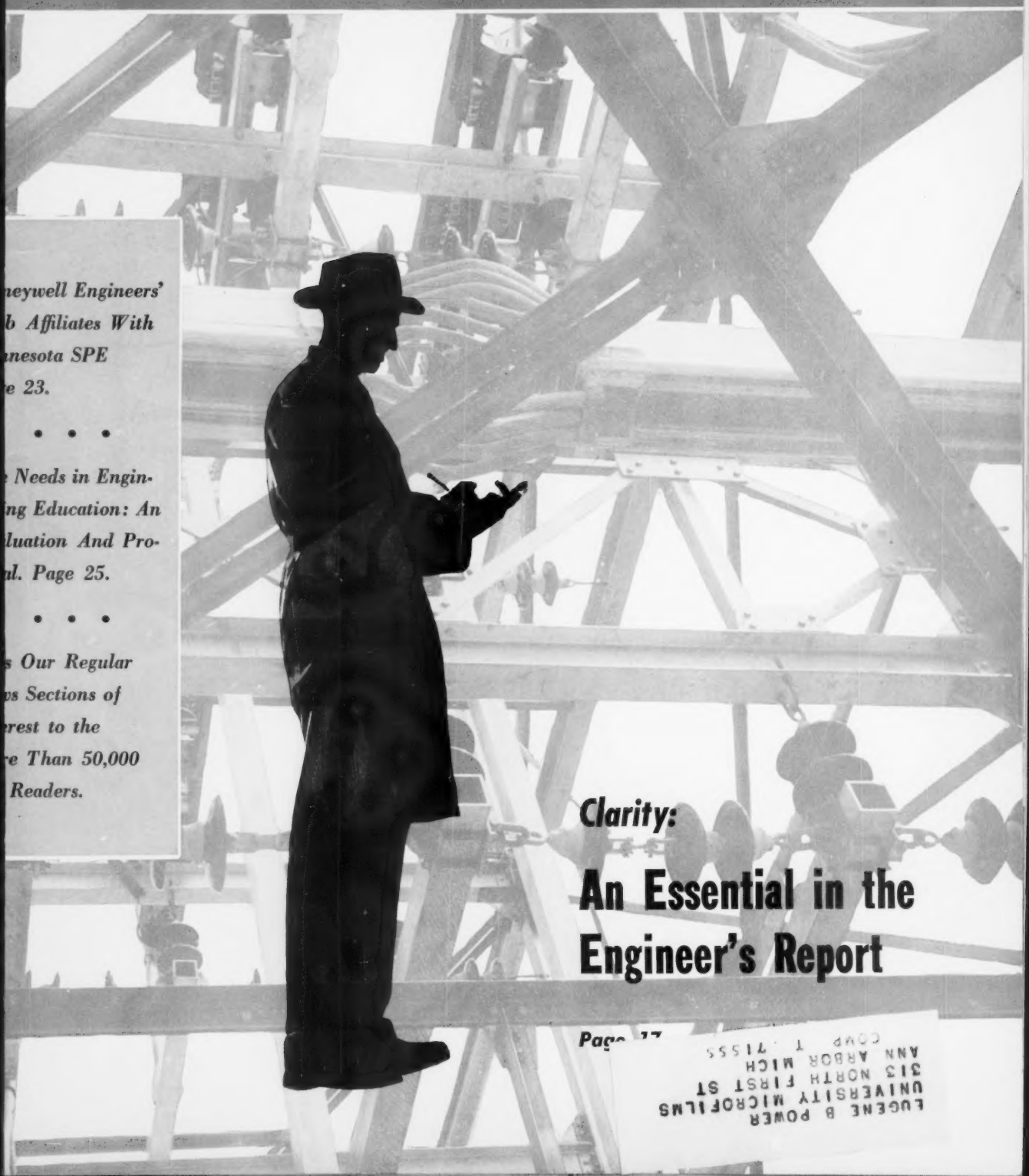
The Magazine of the Registered Professional Engineer

# American Engineer

APRIL 1959



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*Needs in Engin- ing Education: An luation And Pro- al. Page 25.*

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*Clarity:*

## An Essential in the Engineer's Report

Page 17

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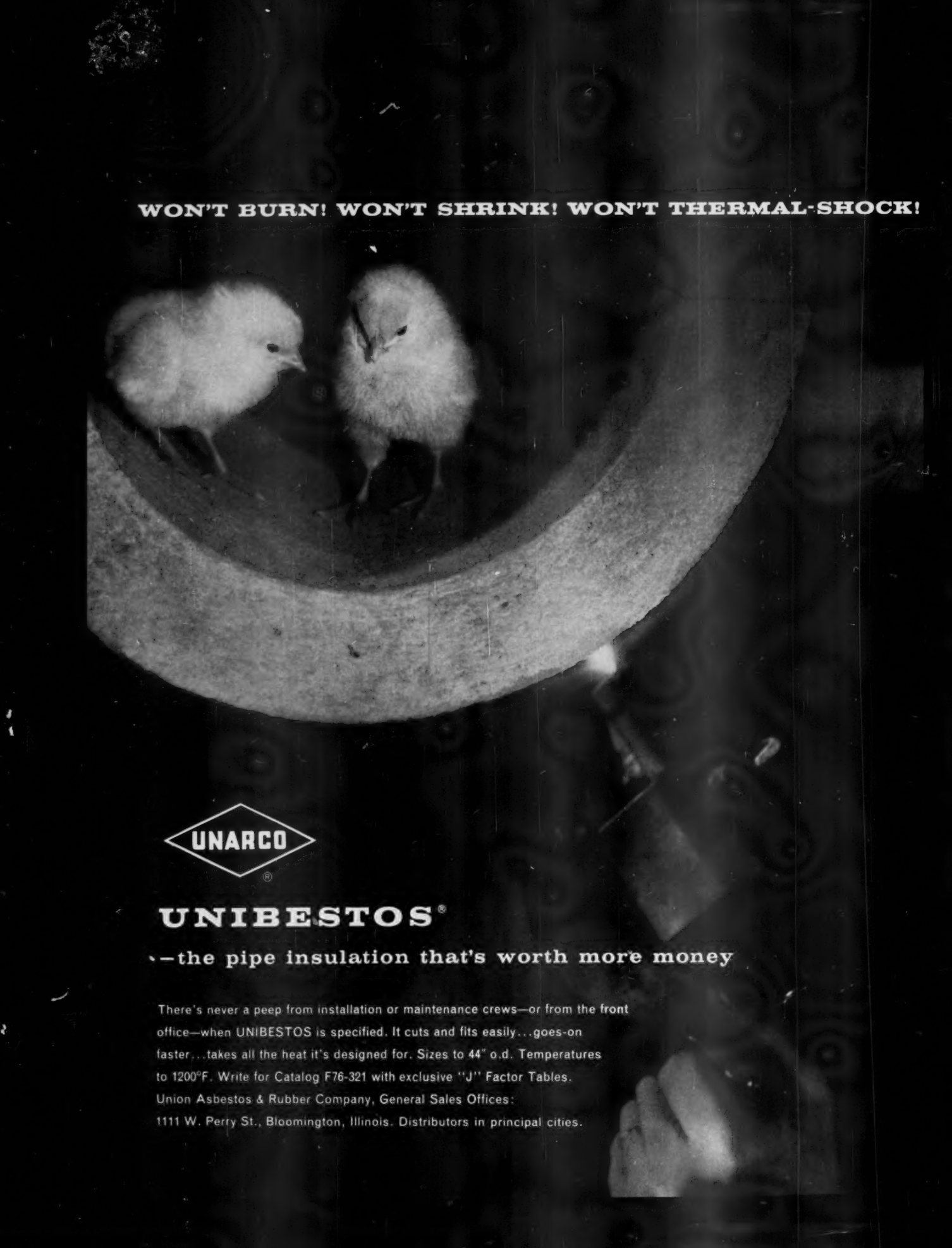
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# American Engineer

APRIL 1959
Vol. 29, No. 4

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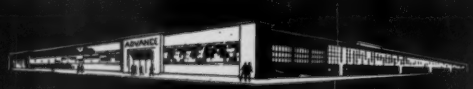

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# "This Month"

Professors Albrecht and Orel are with us again this month, joining their literary talents to bring us "Clarity: An Essential in the Engineer's Report," page 17. After authoring a most popular piece on report writing (AE, July, 1958) we asked them to do something else for us that would help the engineer in turning out a really comprehensive and readable report. They have delivered, as usual, and you will want to keep their latest in your files.

In "Honeywell Engineers' Club Affiliates with Minnesota SPE," page 23, we have a story about "the first affiliation of an industrial 'sounding board' type of organization with an NSPE constituent society...." Read how Honeywell P. E.'s will operate within the framework of a professional group to act upon problems facing the engineer in industry.

On page 25, the associate dean of engineering at New York University, Norman N. Barish, begins his article which is one of the finest evaluations of engineering education we have read for sometime. But it is more than that: Dean Barish makes specific proposals which are important ones for a Space Age world.

"Fundamentals of Unity," by Past President Garvin H. Dyer, appears on page 29 and is an ideal follow-up to the AIEE report story carried in the February issue. A good piece for study.

"This Month" in the news:

In General News you will enjoy a story dealing with industry's search for not only well educated but well trained engineers. Page 7. On page 8 are found reports on two recent surveys: EJC's on salaries, and Deutsch & Shea's on how engineers initially find out about companies in which they are interested.

The big news in "Consulting" is the passage by the House of the Keogh-Simpson retirement bill. A great victory for the self-employed consultant. Next stop is the Senate. Another story: South Carolina's Attorney General has ruled that competitive bidding is "a matter within the sound discretion of the Chief Highway Commissioner of the Highway Department." Page 11.

In "Education" are found items on research grants by the National Science Foundation...cash grants to schools by the Du Pont Company...the new "Endicott Report."

Industry: NLRB rejects union bid at Sperry Gyroscope Company...Attempt to get engineers under Davis-Bacon Act...Large Quebec company recognizes only P.E.'s.

NSPE news in the back of the book: Page 31 brings a complete roundup story on the 1959 National Engineers' Week. Don't miss this article on the profession's number one public relations program. Page 35 announces approval of the dues increase by the membership and, also, its approval of Harold A. Mosher as incoming president. And page 40 brings us up to date on the voluntary fund standings.

Kenneth E. Trombley

Editor

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# Letters to the Editor

### Wage-Hour . . .

Dear Editor:

The recent decision of the United States Supreme Court holding engineering firms liable under the Federal Wage-Hour Act has disturbed many people no end. (AE, February, 1959, page 17.)

For many years our organization has observed the dictates of the Wage-Hour Act with respect to all of its staff members because of the great uncertainty existing as to when a staff member might or might not be properly classified as a professional employee and thereby render his employer exempt from the provisions of the Wage-Hour Act.

Effective February 1, 1959, it was determined by the U.S. Labor Department that professional and administrative employees must be paid at least $95 a week to be exempt from the minimum wage and overtime provisions of the Fair Labor Standards (Wage-Hour) Act. The new rate for executive employees is $80 a week, but there is more to it than that. It is our understanding that the U.S. Labor Department rules that if an engineering staff member is engaged on drafting work or similar "sub-professional work" for more than twenty per cent of his working time, he then becomes subject to the provisions of the Fair Labor Standards Act.

In view of all this hubbub, we in our engineering firm have seen fit for many years past to pay all of our staff members at 1½ times base pay for both authorized overtime and voluntary overtime (beyond forty hours a week).

Many engineering firms have avoided following what now seems to be the acknowledged requirement for paying overtime. Certainly, it is high time that payroll practices be reconsidered and revised by all engineering and architectural firms. Otherwise, the element of unfair competition among such firms is bound to arise.

ARTHUR W. CONSOER, P.E.
Consoer, Townsend & Associates
Chicago, Ill.

### More Wage-Hour . . .

Dear Editor:

No doubt many professional engineers disagree with the Supreme Court's decision that consulting engineering services are subject to the provisions of the Wage-Hour Act. This is just one more decision which should be chalked up as one made by the inexperienced men who are now making up the highest court in the land.

The present Supreme Court has been under fire from many quarters for its handling of Communists, for its "legislation instead of interpretation," and for its other obviously poor decisions. Many of our foremost legal authorities have publicly commented upon actions of the present Court, with more than just raised eyebrows.

Because the Supreme Court is, as its name implies, the highest court to which one may appeal a case, it should be composed of extremely well qualified and experienced men. Certainly it is not the place for a politician to gain his judicial experience. As we all now realize, the majority of the current Court consists of men who have had very little previous judicial experience. If the present trend continues, we may find P.E.'s legislated into unions against their will or some such similar unwanted fate.

A bill to require future Supreme Court appointees to have had at least five years of judicial experience has been introduced in Congress by one of the junior senators. It is a step in the right direction; more should be taken. The active support of all P.E.'s should be given to this legislation.

ROBERT S. DUGGAN, JR., P.E.
Atlanta, Ga.

### New AE . . .

Dear Editor:

I certainly want to compliment you on the new format and revised sections of AMERICAN ENGINEER. This really does offer an expanded service and we compliment (the staff) . . . .

WILLIAM F. RYAN, P.E.
Topeka, Kan.

### AIEE Report . . .

Dear Editor:

May I clap my hands gleefully in concurrence with "A Report from AIEE" appearing in the February, 1959, issue of AMERICAN ENGINEER?

S. E. WEIDLER, P.E.
Schenectady, N.Y.

► *Editor's Note:* Yes.

### Space Age . . .

Dear Editor:

I have read with admiration the fine article entitled "Engineering, New Products, and the Space Age" which appeared in the February issue of the AE. It paints a picture which for engineering is entirely realistic. . . .

GROVER L. ROGERS, P.E.
Blacksburg, Va.

# Utilization Meeting Planned April 24-25

A conference designed to promote better and more efficient utilization of engineers and scientists, will be held April 24-25 on the campus of the University of Kansas City.

The conference is one of twenty being held throughout the United States, under the auspices of the President's Committee for Scientists and Engineers in the Office of Civil and Defense Mobilization.

The program is designed to attract not only executives and supervisors of organizations employing scientific and engineering personnel, but the scientists themselves as well. Titled "Conference on Increasing the Effectiveness of Scientists and Engineers," the program will stress the Midwest area and the particular problems of utilization of scientific training and talent there.

Dr. William Torpey, of the Executive Office of the President of the United States, is the adviser for the conference and will have a prominent place in the program. Honorary co-chairmen of the event are Dr. Richard M. Drake, chancellor, the University of Kansas City and N. T. Veatch, of Black and Veatch. Co-chairmen of the program are Dr. Robert T. Howard, chairman, Department of General Engineering, University of Kansas City, and Melford E. Monsees, chief, Program Development Branch, U.S. Army Engineer District, Kansas City, Mo.

# Lighting Not Adequate On Highways Says GE Vice Pres.

America's multibillion dollar Interstate Highway System may be "fifty per cent obsolete by the time it is completed," a General Electric vice president stated recently.

Harold A. Olson said the highway network can only be used safely and to full advantage half the time—during daylight hours—unless adequate lighting is provided.

He pointed out that lighting costs less than mowing roadside grass, yet neither state governments nor Federal agencies have taken steps to insure that the sprawling, $101.6 billion highway network will be properly lighted for safe, efficient, round-the-clock use.

Mr. Olson, a regional vice president, said it would cost less than one per cent of total road cost to illuminate virtually all highway danger spots.

"About 38,500 people were slaughtered on our highways in 1957 and more than half of these deaths occurred in darkness when traffic was only half as heavy as during the daylight hours," Mr. Olson said.

# Quality Stressed by Industry In Search for Engineers

An engineering degree is no longer a passport to a good job. Industries are placing more emphasis on quality of training.

According to Donald H. Moyer, director of the Office of Student Personnel of Cornell University's College of Engineering, a selective demand for high quality engineers began during 1958.

"The cry now is not so much for more engineers as for better ones," Mr. Moyer says. "The trend, which has real significance, promises to continue."

Writing in the February, 1959, issue of the *Cornell Engineer,* Mr. Moyer says many industries are stepping up their efforts to use well trained engineers to better advantage. "An engineering degree *per se* is no longer an open sesame to a good job," he declares. "The intense competition for engineering graduates which has developed during recent years has caused many companies to train liberal arts graduates to fill jobs previously held by engineers. Many companies have also hired technicians and technical assistants to fill such positions."


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## Tool Engineers Schedule Annual Meet April 18-22

The importance of planning will be spotlighted when manufacturing men from every area in the United States convene at Milwaukee's Hotel Schroeder to take part in the variety of functions scheduled for the 40,000-member American Society of Tool Engineers' annual meeting, April 18-22.

The theme for the convention is "Planning for Profit" and thirdteen technical sessions pursuing this theme are scheduled, including a two-day seminar devoted to the study of controlling manufacturing costs.

Saturday and Sunday, April 18-19, will be devoted to a series of meetings called "Leadership Conferences." These meetings will be attended by the newly-elected chairmen of ASTE's 155 chapters, who will receive information and instructions that will help them to satisfactorily discharge their new responsibilities.

One of the high points of the five-day convention will be the Honor Awards Dinner and third annual Eli Whitney Memorial Lecture. Swan E. Bergstrom, president of the Cincinnati Milling Machine Company, will deliver the lecture.

Honors will be accorded to six men who have made outstanding contributions to the tool engineering profession in the fields of research, engineering, education, writing, leadership and manufacturing methods.

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*(Circle 4 in Readers' Service Dept.)*

## Survey Shows $1,000 Median Increase

The 1958 median salary of engineers ranged from $6,125 for engineers with one year of experience to $11,000 for those with twenty years of experience, according to the salary survey conducted by Engineers Joint Council. The data was obtained from 546 companies, 131 governmental agencies, and 5,658 individual engineering educators. The over-all median was reported at $8,750, compared to $7,750 in 1956 and $6,500 in 1953.

Salary data is provided for twenty-six subdivisions of industry, including separated Ph.D., Sc.D., and M.S. graduates. Government data is separated by Federal, State, and Local categories. In addition to college teachers, statistics are included for technical institute teachers.

Copies of the report are available from the Engineering Manpower Commission, 29 West 39th St., New York 18, N.Y., at $3.00 a copy.

The following table indicates annual medians for selected years of experience:

**Table of Annual Medians**

| Years of Experience | Industry | Government | Engineering College Teachers |
|---|---|---|---|
| 1 | $6,175 | $5,675 | $5,425 |
| 5 | 7,450 | 6,850 | 6,400 |
| 10 | 9,325 | 8,325 | 8,625 |
| 16 | 10,425 | 9,050 | 9,875 |
| 26 | 11,350 | 9,325 | 10,850 |

## Factors in Engineer's Choice of Job Revealed

According to a national sampling of 1,500 engineers by Deutsch & Shea, Inc., technical manpower consultants, "talking with company engineers" ranked first in sources of information about the company in recruiting engineers. Next in importance were: impressions made by company interviewers, visit to plant, and experience with company products. Employment booklets and articles about the company in technical journals ranked lower than personal contacts.

The survey also disclosed a considerable influence by the wives. "Type of work" led the major factors in the engineer's choice of job, followed by salary, location, opportunity for advancement and chance to use creative ability. Nearly eighty per cent felt greatest career opportunities lay outside technical specialization—61.5 per cent in administration, and 17.8 per cent in sales. But the majority preference is for technical work if salary and opportunity are equal.

## Report Shows Lag in Right-of-Way Salaries

Lack of recognition for right-of-way personnel is handicapping the highway construction program. The chief problem is the relatively low level of right-of-way salaries, compared to engineering and other professional salaries in the highway organizations. So states a special report of the Highway Research Board, "Highway Right-of-Way Personnel Salaries—An Economic Analysis."

## Meetings of Note

**American Chemical Society**—National Meeting, April 5-10, Boston, Massachusetts.

**Engineers Joint Council**—Nuclear Congress, April 5-10, Public Auditorium, Cleveland, Ohio.

**American Welding Society and American Institute of Electrical Engineers**—Annual Meeting and Welding Exposition, April 6-10, Hotel Sherman, Chicago, Illinois.

**American Institute of Tool Engineers**—Annual Meeting, April 20-21, Hotel Schroeder, Milwaukee, Wisconsin.

**American Society of Lubrication Engineers**—Annual Meeting, April 21-23, Hotel Statler, Buffalo, New York.

The average annual income of state right-of-way personnel in 1956 was only $5,536, according to the survey, considerably below the average engineering salary, although most state right-of-way officials have engineering backgrounds, the report said. For the complete 98-page report (Publication 604) contact the Highway Research Board, 2101 Constitution Ave., Washington 25, D.C.

## Two Societies Merge; Officers Announced

The merger of the American Society of Heating and Air-Conditioning Engineers with the American Society of Refrigerating Engineers has been completed. Officers of the new organization, American Society of Heating, Refrigerating and Air-Conditioning Engineers, have been announced as follows:

Cecil Boling, W. Hartford, Conn., president; Arthur J. Hess, Los Angeles, Calif., 1st vice president; Daniel D. Wile, Los Angeles, Calif., 2nd vice president; Walter A. Grant, Syracuse, N.Y., 3rd vice president; Robert H. Tull, Springfield, Mass., 4th vice president; John Everetts, Jr., Philadelphia, Pa., 5th vice president; John H. Fox, Toronto, Ontario, 1st treasurer, and Franklyn Y. Carterm, Detroit, Mich., 2nd treasurer.

## Six Standard Contract Forms Now Available

Standard contract forms covering engineer-architect and architect-engineer agreements are now available. The forms have been developed by NSPE's Interprofessional Relations Committee.

Six forms have been prepared, three where the engineer is principal and three where the architect is principal. *(See page 39 for information on obtaining these forms.)*

## ASCE National Meeting Planned in Cleveland

City planning, nuclear power problems and improvement in navigation on the Great Lakes are the highlights of the national convention program of the American Society of Civil Engineers to be held in Cleveland, Ohio, May 4-8.


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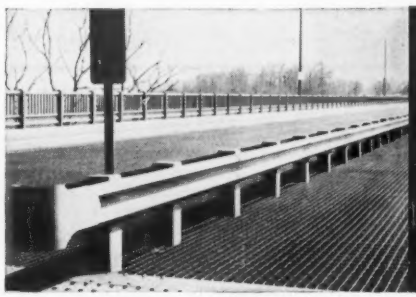

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## Consulting

# House Passes Keogh-Simpson Retirement Bill, H.R. 10

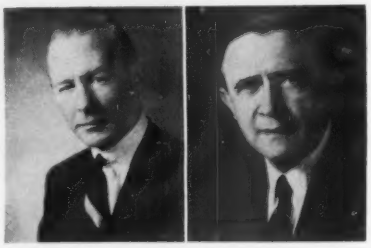
### • Vogt Hails Overwhelming Victory

### • ATA Plans Intensive Senate Campaign

On March 16, 1959, the Keogh-Simpson, self-employed retirement, bill passed the House by an overwhelming voice vote. The bill is in the same form as that which passed the House last July in that self-employed professional and business men could annually set aside up to $2,500 or ten per cent of self-employment income, whichever is less, to a lifetime total of $50,000. Taxes would be deferred on income set aside until the individual retires, usually at sixty-five, at which time taxes would be paid as sums are withdrawn from the retirement fund or annuity. The impact of the tax, however, would generally be at a time when the individual is in a lower tax bracket.

Commenting on the House victory, Robert C. Vogt, NSPE representative to the American Thrift Assembly and a member of its Executive Committee and Board of Directors, stated that "the vote today is a gratifying reflection of the intensive efforts of the American Thrift Assembly and its constituent organizations of self-employed professional and business men. I am particularly pleased with the fine showing made by engineering consultants, both through their generous financial assistance and cooperative 'grass-roots' support in the mailing of letters and telegrams to various key members of the House. Consulting engineers, through their efforts on behalf of H.R. 10, have proven to members of the other learned professions their willingness to work for a common cause, and to continue that effort until success is achieved."

The House vote followed by one day a strong attack on the Keogh-Simpson bill made by Treasury Secretary Robert B. Anderson to the chairman of the House Republican Policy Committee. Anderson characterized the bill as a "tax break for the well-to-do," and stated that "tax relief of this magnitude should not be permitted at a time when general tax relief is not possible."



The bi-partisan House sponsors of the self-employed retirement bill are Representatives Eugene J. Keogh, (D., N.Y.), left, and Richard M. Simpson, (R., Pa.)

The bill now goes over to the Senate where it will be referred to the Senate Finance Committee. From a tactical standpoint, the most important hurdle facing the proponents of the Keogh-Simpson bill now will be to impress upon the Finance Committee the necessity for prompt public hearings. In his statement following House passage, Vogt called upon all consulting engineers to renew their activities insofar as the Senate is concerned, and urged them to contact the Senators from their state. "With House passage coming so early in the 86th Congress," Vogt stated, "we can, and must, direct our full energies to impressing upon the Senate the soundness and vital necessity for approval of H.R. 10."

## Moses Hits Relegating Work to 'Bureaucrats'

Robert Moses, well-known New York City municipal official, has vehemently opposed relegating the employment on public work of skilled professional consultants to government "bureaucrats" in a recent article in *The New York Times* entitled "Should Private Firms Plan Public Works?"

Included among Mr. Moses' many titles are chairman of the New York State Power Authority, chairman of the Triborough Bridge and Tunnel Authority, Park Commissioner of New York, and City Construction Coordinator.

In a lengthy article which appeared in *The New York Times Magazine*, Mr. Moses proposes "to make an honest, impartial analysis of the reasons why relying on the rank and file of public employes to furnish all professional advice, diagnosis, plans and supervision to the exclusion of outside consultants would be suicidal."

"Let me offer an example of the drive for exclusive government planning," he states. "In connection with the vast new Federal Aid Highway Program, involving some fifty billion dollars over a period of twelve years, and especially the 41,000-mile interstate network, there has been serious discussion at various meetings of state highway officials of the question of eliminating private firms. The adoption of such a policy, if it were followed by legislation to put it into effect, would in my opinion go far toward ruining this great program, especially in the urban areas of the nation, and would inevitably spread

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into the design and inspection of other public works, including slum clearance, housing, power, bridges, parks and every conceivable kind of construction carried on or aided by public funds."

Mr. Moses adds that "The objective of the proponents of this philosophy is clearly to prevent the employment on public work of skilled professional consultants, experts and technicians, notably competent engineering and architectural firms, and to relegate all such work to permanent public employes, to bureaucrats, and to the bureaucrats who are over the bureaucrats. The character of the work to be performed, the size of the program, the urgency of the improvements, and above all, the professional and technical skills and problems involved and the necessity of independent judgment and superior talent are ignored. Government engineers are essential. So are outside consultants. Both have their place. . . .

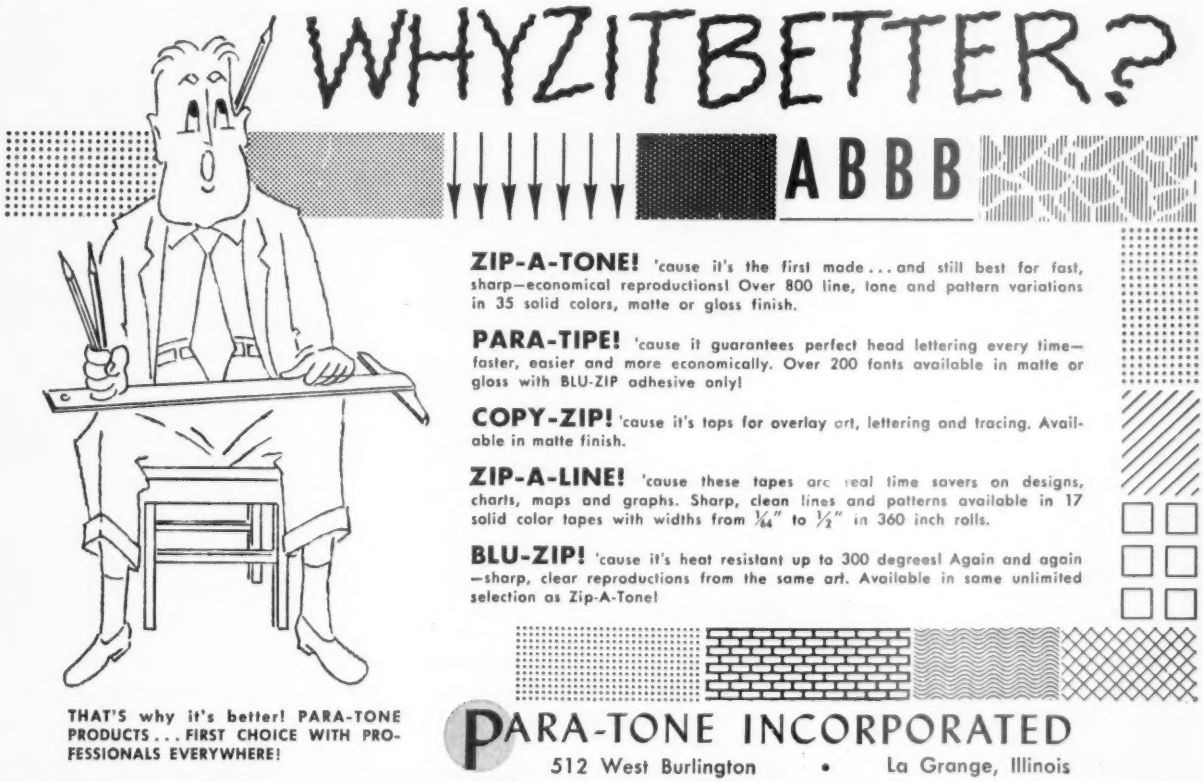
"Outside professional consultants, firms and companies can seek their talent anywhere regardless of restrictions; they can advance and reward at will; they can make it possible for exceptional men to become partners. Public business, on the other hand, suffers from mortmain, from absurd residence and age restrictions, seniority systems, veteran and other preferences, uniform efficiency ratings which in any event cannot reflect either lively imagination or executive ability, all aimed to maintain a level of satisfied mediocrity and the democratic rule of the lowest common denominator . . .," he continues.

## Competitive Bidding Held Discretionary

The question of advertising and competitive bidding for engineering services is a matter within the sound discretion of the Chief Highway Commissioner or the Highway Department, South Carolina's Attorney General ruled recently. The opinion was rendered in reply to a specific question as to whether under applicable South Carolina statutes the State Highway Department is required to advertise and accept bids for engineering services.

South Carolina law provides that all construction contracts made by the State Highway Department which contemplate the expenditure of more than $10,000 shall be advertised and let to the lowest qualified bidder. Applying this provision to the rendition of professional consulting engineering services, the State Attorney General has ruled that "it is not mandatory for the Department to advertise for professional services of bridge or other engineers on any bridge or highway project." "However," the decision continued, "it is my opinion that the amended Act does not prohibit the Department from advertising for such professional services."

Consequently, the Attorney General concluded that "the question of advertising for engineering service is a matter in the sound discretion of the Chief Highway Commissioner or the Highway Department."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# National Science Foundation Announces Research Grants

The National Science Foundation has announced the award of fifty-six grants totalling approximately $800,000 to fifty-four educational institutions for the purpose of conducting programs in Research Participation for Teacher Training in the summer of 1959.

These programs will provide research experience during the summer months for about 550 teachers of science and mathematics. About 400 of these will come from secondary schools; the remaining 150 will come from junior colleges and small colleges without appropriate research facilities.

In these programs science teachers with adequate scientific background will become better acquainted with the nature and methods of research, so that their teaching will become more meaningful and stimulating. The National Science Foundation is supporting these experimental programs to provide further opportunities for teachers during the summer, in addition to the Summer Institutes for High School and College Teachers.

Teachers will participate directly in scientific research in the laboratories of universities and colleges, or in field research programs, alongside experienced scientific investigators. This actual research experience will be supplemented by seminars and lectures on research methods and advances.


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## Increases Shown in "Endicott Report"

The thirteenth "Endicott Report" on "Trends in the Employment of College and University Graduates in Business and Industry—1959" shows some increase in the planned employment of engineering graduates for 1959 over 1958, and a slight increase in average starting salaries, from $472 to $480.

Of 184 companies surveyed, the 1959 hiring of engineering graduates was estimated at 6,762, compared to 5,866 hired in 1958. Among non-engineering graduates, however, the comparable figures were 9,033 and 7,669. The salary data was based on reports from 194 companies, showing comparable starting rates for accounting at $422, compared to $417 in 1958. Other figures were: Sales, $419 and $412; General Business Trainees, $413 and $407; and Other Fields, $438 and $432. In engineering, the average bottom of the range was $450 and the average top, $503.

## Du Pont Company Awards $1,200,000 to Schools

Grants totaling nearly $1,200,000 have been awarded to 139 universities and colleges in the Du Pont Company's annual program of aid to education. The entire program is for fundamental research by universities and for strengthening the teaching of science and related liberal arts in the 1959-60 academic year.

Du Pont nearly doubled its grants for unrestricted research in the physical sciences because of the growing need for this type of work, which the company has been supporting since 1949, and because of the flexibility of this form of support.

These funds may be used for fundamental research in any way the institutions wish, including the support of graduate students which the company has previously provided by a separate series of postgraduate fellowships initiated in 1918. The universities determine the research to be undertaken and are free to publish the results.

For this work, the company gave $450,000 to thirty-six universities in grants ranging from $5,000 to $20,000 for fundamental research in chemistry, chemical engineering, physics, mechanical engineering, and metallurgy. An additional $27,000 was awarded for eighteen summer research grants of $1,500 each. The purpose is to enable individual staff members of seventeen universities to undertake research of their own choosing in chemistry and engineering during the summer.

As has been the case in recent years, the largest part of Du Pont's program is to help strengthen the education of engineers and scientists. Grants totaling $696,000 were awarded to more than 100 colleges and universities to support the teaching of science and mathematics as well as other subjects. These have proved effective in science, mathematics, and other liberal arts courses as well as in medicine.

# NLRB Rejects Union Bid at Sperry Gyroscope Company

An effort by the engineers' union at Sperry Gyroscope Company to add plant layout draftsmen, process layout engineers, and architectural designers to the bargaining unit was recently rejected by the NLRB because the twenty-four employees involved are only part of a larger unrepresented group of technical employees. Without passing directly on the professional status of the employees, the Board noted that a technical high school education is required, but some of the employees have taken supplemental engineering or drafting courses, although most of the training for the work is acquired on the job. Consequently, the Board determined the employees involved were "technical," along with approximately 400 other "technicals" which the union did not seek to represent in the petition.

Meanwhile, the same union, Engineers Association, is reported to be claiming jurisdiction over approximately 200 employees of design firms working under contract at Sperry's plant. The union wants to represent those employees, who are not on Sperry's payroll, because they are said to report to Sperry supervisors and their salaries are said to be influenced by Sperry supervisors. The union's president, Charles Hall, was quoted as saying: "If we permit the company to indiscriminately subcontract the work which belongs to members of our bargaining unit, there is a great danger that our effectiveness as a bargaining agent for all engineering employees will be irreparably damaged."

If the company does not agree to the EA demand the union said it may take the case to arbitration or file a refusal to bargain charge with the NLRB against the company.

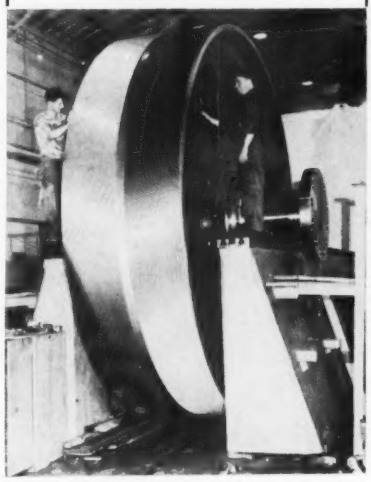
## Davis-Bacon Amendments Would Cover Engineers

Companion bills in the Senate and House revive an attempt dating back to 1950 to sweep "architects, technical engineers, draftsmen and technicians" under the Davis-Bacon Act. The 1935 law, which requires the payment of prevailing minimum wages on Federal construction projects for more than $2,000 (including subcontracts under the prime contract), now applies only to "laborers and mechanics."

The new legislation is intended to expand the application of the law to construction projects in excess of $25,000 value if the Federal Government finances one-third of the cost, and for construction projects under Federally insured or guaranteed loans. In addition, the revisions would expand "prevailing wage" to include health and welfare, retirement, vacation and apprenticeship payments, and premium pay for overtime would be required.

NSPE has advised the Senate and House Labor Committees that it wishes to testify in opposition to the inclusion of professional employees of contractors should the bills be considered. (S. 1119, H.R. 4362)

**Giant Gear**



The 70,000-pound bull gear which will drive the world's first atomic merchant ship nears completion at De Laval Steam Turbine Company's plant, Trenton, N.J. The big main drive gear measures 176 inches in diameter and 48 inches across the gear face. It is the largest unit of the N.S. "Savannah's" propulsion machinery.

## Large Quebec Company Recognizes Only P.E.'s

The Northern Electric Co., Ltd., largest employer of engineers in Quebec, has announced that only registered engineers under provincial law will be recognized as, and assigned, the title of engineer. The company statement said, "It has been felt for some time that such action would be for the benefit of the engineering profession and would be an incentive for potential members to achieve professional recognition."

## Losing Union Claims Rebutted in Penna.

The Pennsylvania Power & Light Company has rebutted the claims of the losing union in the recent election among engineers that the company's presentation to the employees was unfair. In a statement on the assertions of the Utility Engineers Association, ESA, the company said it gave the voting employees a "comprehensive discussion of the many reasons why

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employees in a profession such as engineering would be better off if not represented by a union." The statement was put into writing to avoid misunderstanding, the company added, and "was entirely within the right of free speech and fair comment." The engineers, in turning down the union by a 110-to-42 margin, "were fully exercising their free choice in the election." The union's request for a new election is pending before the NLRB.

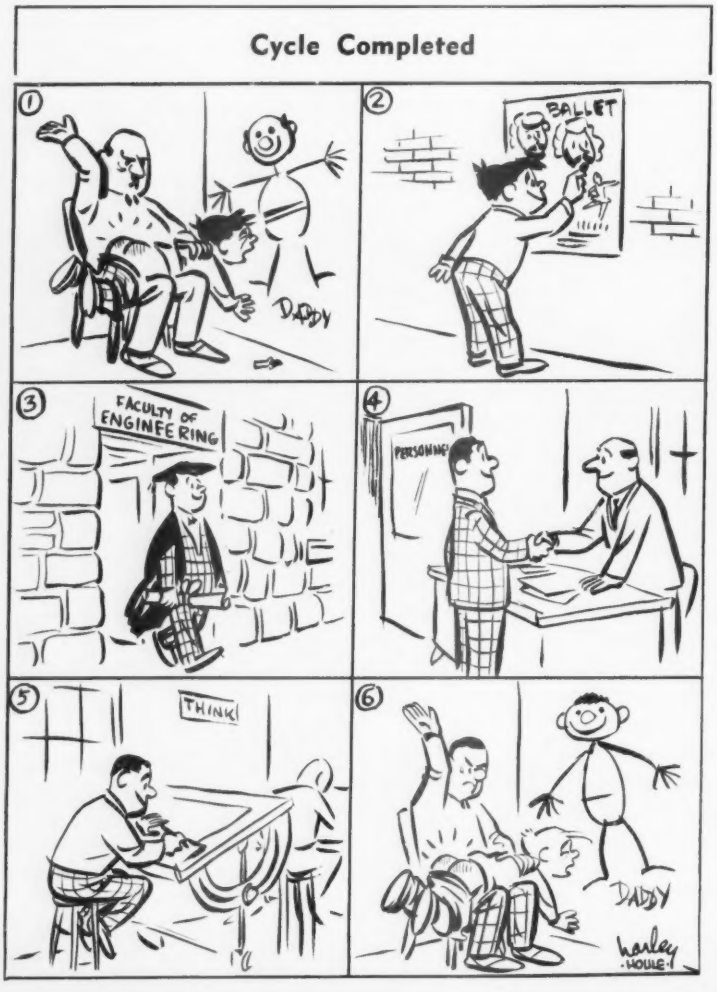
## New Film Available On Slip-Form Paver

A film entitled "Low Cost Concrete Highways With the Slip-Form Paver" was premiered in Washington, D.C., recently by the Portland Cement Association before members of the U.S. Bureau of Public Roads with H. A. Radzikowski, chief of the Bureau's Development Division, presiding.

The 16mm film, which is in sound and color, shows how concrete pavement is placed with the latest model of slip-form paver. It includes the various methods of fine grading operations, as well as mixer operations for shoulders and roadbeds where shoulder widths will not permit use of the mixer.

Twelve minutes in length, the film is of special interest to engineering and contracting personnel, since it depicts all of the paving operations with a slip-form paver from grading and placement to the curing and sawing of joints.

The film is available on a free-loan basis through all Portland Cement Association district offices, as well as its headquarters in Chicago.



# Strictly Business

***Personalities . . .*** The affiliation of **George G. Crewson, Jr.,** with **General Controls Company,** Glendale, Calif., as field engineer in the Industrial Controls Division has been announced by **William A. Ray,** president . . . **John A. Draxler** has been named chief engineer of **The Elwell-Parker Electric Company,** Cleveland, Ohio . . . **Ebasco Services, Inc.,** New York, N. Y., has announced the appointment of **F. A. Ritchings** as consulting mechanical engineer . . . **Thomas F. Read** has been appointed manager of engineering and estimating for the Montebello (Calif.) Fabricating Division of **Kaiser Steel Corporation . . . Ralph A. Smith** has been appointed chief materials and test engineer for Fulton Sylphon Division, **Robertshaw-Fulton Controls Company,** Knoxville, Tenn. . . . **John C. Smaltz** has resigned as president of the **McKiernan-Terry Corporation,** Harrison, N.J., in order to devote his entire time to the engineering and research work of the organization as its consulting engineer. **Carl W. Shattuck** has been elected as the new president . . . The appointment of **Arthur L. Wannlund, Jr.,** as director of device engineering has been announced by **Continental Device Corporation,** Los Angeles, Calif.

Mr. Crewson

**Daniel S. Gaidosz** has announced that he is now actively engaged as a professional engineer offering consulting services in electrical design with offices in West Haven, Conn. . . . **Frank J. Scott** has been named industrial engineer for **The Bunting Brass and Bronze Company,** Toledo, Ohio . . . **Bernard Johnson & Associates,** Houston, Tex., have announced the appointment of **Paul C. Nail** as project engineer . . . **Robert Reed** has been promoted to the newly-created post of vice president in charge of engineering for the **John Zink Company,** Tulsa, Okla. . . . **Walter R. Kuzmin** has joined **Packard-Bell Electronics,** Los Angeles, Calif., as manager of reliability engineering in the Technical Products Division . . . **Russell E. Witt** has been appointed director of Military Cabling Operations for **Pacific Mercury Electronics** with headquarters in Van Nuys, Calif. . . . **Dr. Mervin J. Kelley,** retiring chairman and former president of **Bell Telephone Laboratories,** has been engaged by **International Business Machines Corporation,** New York, N.Y., as a consultant on research and engineering matters . . . **H. R. Alexander** has been appointed director of field engineering for the Whittaker Controls Division of **Telecomputing Corporation,** Los Angeles, Calif.

Mr. Nail

**Edward A. Sobolewski** has joined the consulting engineering firm of **Fred S. Dubin Associates** as associate in charge of the New York office . . . **The Asphalt Institute,** College Park, Md., has announced the appointment of **Clinton C. Gregory** to fill the new post of district engineer for North and South Dakota . . . The appointment of **Russell P. Westerhoff** as chief engineer and **Stuart R. Fleming** as manager of the engineering department of **Ford, Bacon & Davis, Inc.,** New York, N.Y., has been announced by **Charles C. Whittelsey,** president . . . **Donald M. Tucker** has become a member of the firm of **Outlaw and Associates,** Gainesville, Fla., and the name has been changed to **Outlaw, Tucker, and Associates** . . . The promotion of two key engineers on **Sika Chemical Corporation's** staff and the appointment of a third has been announced by the Passaic, N.J., firm. **R. A. Jessen** has become chief engineer; **J. Wayman William, Jr.,** has assumed the duties of manager of technical services, and **Robert K. Lockwood** has joined **Sika** as advertising manager . . . The appointment of **Cloyd L. Betzer** as technical manager at the **Pfaudler Company,** a division of **Pfaudler Permutit Inc.,** Rochester, N.Y., has been announced.

Mr. Westerhoff

**Charles A. Maguire & Associates,** Providence, R.I., have announced the following men as associates in the firm: **Harold Bateson, Peter V. Cipolla, Robert L. Pare, Gordon Bronson, Thomas C. Murphy, Francis C. Pierce,** and **Eric Reeves.** In addition, the firm has announced that **Wendell S. Brown** and **Edward O. Greene** will serve as special consultants . . . **Phillip L. Auger** has retired from **General Electric Company,** Schenectady, N.Y., after a 40-year career with **GE . . . J. G. Wills** has been named manager-manufacturing of **Blaw-Knox Company's** Equipment Division, Blawnox, Pa., near Pittsburgh . . . The promotion of **Arthur J. R. Schneider** to chief engineer of the Technical Products Division of the **Waste King Corporation,** Los Angeles, Calif., has been announced . . . **Donald E. Smiley** has been named president of **Pico Precision Products Company,** a subsidiary of **Pendleton Tool Industries, Inc.,** Los Angeles, Calif. . . . The appointment of **Kenneth R. Bragg** to the position of chief systems engineer of **Parker Aircraft Company,** Los Angeles, Calif., has been announced . . . **John T. Pinkston** has been named process consultant for **United Engineers & Constructors, Inc.,** Philadelphia, Pa.

Mr. Auger

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# Clarity: An Essential in the Engineer's Report

By

**PROFESSOR W. P. ALBRECHT**
*Chairman of the Department of English Language and Literature, University of Kansas*

**and**

**ASSOCIATE PROFESSOR HAROLD OREL**
*of the same Department at the University*

THE world is a crazy, mixed-up place: we all agree on that. But surely one of its odder aspects is the fact that those who think most meaningfully, those who have most to say to their fellow men, very often cannot communicate clearly or well. Their professional vocabulary is too specialized. Since the concept of clarity is more often talked about than understood, perhaps a discussion is in order. In particular, the engineer wants to know whether his audience follows what he is saying. Often, he communicates with his audience by means of reports that summarize work on extremely expensive projects, and his audience must be able to follow what he has written.

During the early 1920's a distinguished German philosopher, Ludwig Wittgenstein, wrote in his *Tractatus Logico-Philosophicus*, "Everything that can be thought at all can be thought clearly. Everything that can be said can be said clearly." Like many students of language, he argued that a man who thinks logically and clearly will turn out a prose that will be both logical and clear. The style proclaims the man. And Lord Macaulay's words are worth recalling: "Obscurity and affectation are the two greatest faults of style. Obscurity of expression generally springs from confusion of ideas; and the same wish to dazzle at any cost which produces affectation in the manner of a writer is likely to produce sophistry in his reasonings."

An engineer, of course, is not trying to dazzle his reader "at any cost," and affectation is hardly ever his problem. He is simply trying to report on what he has done; his honesty goes without question. But, like many other writers, he is uncertain how to establish criteria whereby he may judge the clarity or the obscurity of his technical report. His uncertainty is tied up, all too often, with the confusion of ideas that Lord Macaulay was talking about.

A technical report should tell what the engineer has done; what his data are; and how he interprets his data. It should be organized as a convenient, usable document, and its usability depends in large measure on how clear it is. How, then, can engineers make their reports clear and therefore useful?

For the longer report, the Table of Contents is crucial. Many reports circulate through laboratories, government installations, industrial firms, and research organizations without any breakdown of subject matter; such a breakdown belongs at the beginning, and it should list the chapter titles which are given within the report. The volume of technical reports that each of us must read to keep up with our work is tremendous; not many readers will want to go through the entire report to find out how it has been put together.

The duty of assembling a Table of Contents should not be regarded as an onerous chore, to be passed on to the typist or to the typists' pool. Typists make mistakes when such responsibilities are given to them. They are not paid to be editors, and they do their main job, typing, as it should be done: a full-time proposition. It is surely not their problem to make sure a Table of Contents lists accurately every chapter, graph, table, and illustration in the report. If the listing is inaccurate, the reader at the other end of the line will blame the man whose name is signed to the report rather than the typist.

In addition to its obvious value as a quick reference tool, the Table of Contents reminds the engineer that every illustration should have a caption. In literally thousands of good-sized reports that are published each year, some figures have explanatory tags, some do not; some of the figures are referred to in the text, and some are not; and some of the figures are absolutely incomprehensible. A Table of Contents will not eliminate these problems; it will, however, remind the engineer that they exist. (We have even seen a report, prepared at great cost and ready for distribution, that contained the illustrations for an entirely different report. Luckily, a Table of Contents, added at the last moment, enabled the author to catch the mistake in time.)

Technical illustrations are not always as clear as they might be. The

subject, admittedly, is too broad for a few generalizations; but often graph paper with too many grid lines is used, and the curves do not stand out boldly enough from the background. A fine grid is necessary when points must be taken right off the figure; but most figures simply illustrate points already made in the text (unless the report consists of all figures and no text, in which case we are dealing with another species altogether). The ordinate and the abscissa should be clearly labelled. The figure should not be cluttered with so much explanatory matter that the reader is hard put to see where the figure is. (Leroy lettering may be the curse of the drafting class.) Units of measurement should be plainly labelled as inches, feet, Fahrenheit or Centigrade, etc. And always the engineer should ask himself, "Is the figure really necessary?"

TECHNICAL reports benefit greatly from illustrative materials; we all favor their inclusion; we prefer two-color illustrations to black-and-white, and three-color to two-color; we like fold-ins and fold-outs; flow charts, bar graphs, pie graphs, maps, and three-dimensional line graphs. But we like them best when they contribute to the meaning of the text, when they have something to say that words cannot say as well, when they are usable and clear. In some reports, completeness justifies their inclusion, but less important figures belong in an appendix, and an engineer who likes to throw every figure that he has ever worked on into the finished technical report is making things tough for his reader. A report choked with figures is hard to read.

An engineer must judge for himself whether some of his illustrations repeat points made in earlier illustrations, and do so before his reader handles the report. Good technical reports are digests, not dumping grounds. The reader has less taste for editing than many engineers unreasonably assume. Conciseness aids the cause of clarity.

But the principal problem of clear writing may be expressed thus: the writer has to find symbols that mean to the reader what they mean to the writer, and he must arrange these symbols in a pattern which makes the reader aware of the relationship that exists among them *in the writer's mind*. These symbols are usually (but not always) words, and the patterns are sentences, paragraphs, and still larger units of organization.

The words themselves offer numerous problems. Words will be selected within one of two different situations: (1) when the writer knows what he is talking about, and (2) when he doesn't. When the symbols are clear and related in the writer's mind, meaning results. When the symbols are vague and unrelated in the reader's mind, confusion results. The first situation is obviously more desirable, but even the writer who knows what he has to say may stop short of effective communication.

All words are abstractions. That is, no word is truly equivalent to the thing it refers to. But some words are more specific, nearer the level of experience, than others. "The motor is short-circuited" is a more specific and therefore clearer statement than "the gadget is fouled up." Used to describe how a bracket is attached to a beam, "welded" is a more specific and therefore better word than "fastened." Sometimes, therefore, clarity is simply a matter of using specific words instead of general ones. But not all words in a report or technical article—or any other kind of writing—can be equally specific. General terms are an indispensable kind of shorthand. How clumsy and uneconomical it would be if the word "machinery" were not available to refer to all the lathes and hoists and gasoline engines in a

In addition to words, this engineer may find he will need considerable illustrative material to effectively report on the performance of this equipment.

On the spot inspection before making the report. The next job is making what is known in the writer's mind easily conveyed to the reader.

factory! Generalizations, therefore, are often useful, especially in abstracts, introductions, conclusions, summaries, and recommendations. But they are likely to be meaningless to the reader unless they are supported by statements couched in specific terms.

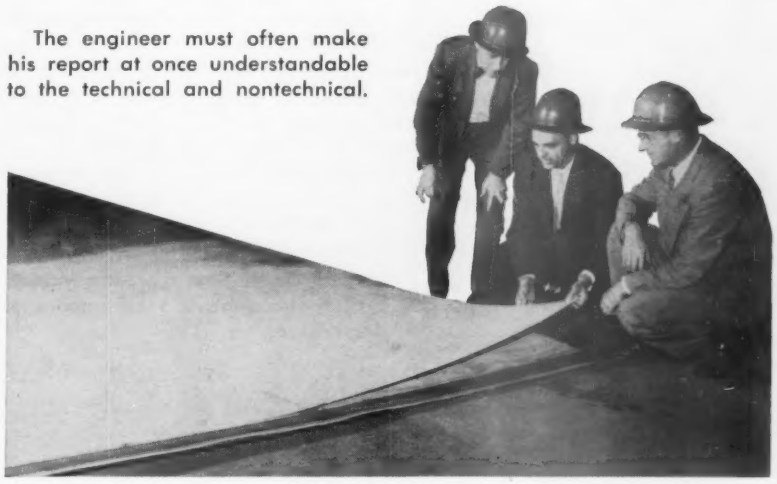
Words may vary not only in having *larger or smaller* areas of meaning, but in having different areas of meaning. Words must be chosen that carry as exactly as possible the meaning that the writer has in mind. He should not use "infer" when he means what most people mean by "imply," nor should he claim to be "disinterested" if he is merely "uninterested." The dictionary will, of course, tell him what most good writers and speakers (and therefore good readers) understand by certain words. But when it comes to definition, he should not rely only on dictionaries. He may want to use a word that is not defined in the dictionary: at least not in just the sense he wants to use. He will have to define words which he uses in an arbitrary sense for his own particular purpose, and technical terms that may not be familiar to all his readers. He must know his audience, or possible audience. A report or article, even if not written for the general public, may well have more than one audience or an audience with varying degrees of technical specialization. The vice president in charge of sales, who may read at least part of the report, is likely to have a different technical background from the manager of circuit-breaker engineering, in whose department the report originated. Common sense and a little imagination should enable the technical writer to decide which terms he must define.

Provided he is aware of the problem.

UP to now we have been assuming a writer who knows exactly what he wants to say, and is merely looking for the right words, or is defining terms that might not be understood. This is a more or less hypothetical situation. We think in words, and our thoughts are not likely to be clear even to ourselves until we have put them into connected discourse. We simultaneously think ourselves into writing, and write ourselves into thinking. If we have not thought a thing through, we take refuge in vague, general language that could mean a whole lot of things—or nothing at all. One of these "things" might be what we're really getting at; but the reader doesn't know, and neither do we, really, or we should have said it in the first place. "To think a thing through" is a generalization that stands for a complicated process, one not easy to express in specific terms. It means to sort out and correlate certain elements of experience, give them comprehensible names, and arrange these names with other words in order to express, as concisely and accurately as possible, our mental act of analysis and synthesis. This process was incomplete when a technical writer put down, after having described the costs of operating a dryer in a commercial laundry, "This refutes the idea of economy." The *idea* of economy is not refutable, any more than sin, a tree, or the color red is refutable. What might be refuted—and what the technical writer intended to refute—is the proposition that the dryer is cheap to operate. Rules and grammar books are less useful than down-to-earth logic when one confronts such atrocities as: "The temperature of the receiver was found to always be lower or cooler than the source of heat." (It is not the split infinitive that we object to.) And: "When enough observations are made to convert fact to a composite theory concerning the fact and further to a law of nature, the resulting law is said to be true." And: "The background of the face is movable which is divided by a horizontal line which passes through the center of the face."

These examples may make more forceful our belief that logical writing requires both the accurate choice of words and their accurate arrangement. Diction and organization are interdependent, each affecting the other. But coherent writing, accurate in diction and firm in structure, may still be hard to read. Readability is an important problem involving both the choice of words and the structure of sentences and larger units. Diction and organization should always be as simple as possible. Complexity of phrasing and structure are justified only to the degree that the writer's material and meaning are complex. Truly logical writing makes a perfect fit of meaning and expression, without loose folds or wrinkles.

Coleridge, in *Biographia Literaria*, wrote for our time when he declared that whatever is translatable in other and simpler words of the same language, without loss of sense or dignity, is bad. Whatever



The engineer must often make his report at once understandable to the technical and nontechnical.

is unreadable is bound to be unclear. It is interesting, if nothing more, that two out of three words in Lincoln's Gettysburg Address (not a technical report, but a compressed message) are monosyllables; only twenty-one words in the entire Address have more than two syllables. Simplicity of diction is an asset. If the average sentence on a page of a technical report exceeds a length of twenty words, and if most of those words are polysyllables, and if the tendency to use jargon is heavy-handed, a reader will lose interest. He does not like to think of himself as a captive audience. Anyway, his attention span is limited.

How many times have we opened a report at random, and found that the given page at which we are looking consists of a single unbroken paragraph of text? Sometimes, too, the page after that, continuing the same paragraph! Trying to find the major idea in such a sea of print is not easy. A paragraph, to be clear, must exhibit three characteristics, and these must exist whether it deals with a technical or with a nonspecialized subject. It must be unified, it must be coherent, and it must be adequately developed.

Unity in a paragraph exists when every sentence in that paragraph contributes to the meaning of the central thought. That central thought—often called the topic sentence—is usually the first sentence in a well-written paragraph of scientific or technical prose.

To be coherent, a paragraph must develop smoothly from one sentence to the next. The order of arrangement of sentences should be logical. Pronouns referring to the preceding sentence, repeated words or ideas, transitional expressions, and parallel structure will also strengthen one's sense of clarity.

Adequate development exists if the topic sentence has been fully explained, and if the paragraph states what the author intends to say.

True, these are fundamental matters of composition, but they are of concern to engineers who write poor technical reports. If they are not so now, they should be. The importance of the subject matter will not justify the omission of a Table of Contents, negligent editorial supervision of illustrations, word-padding, jargon, complicated sentence structures, and poorly constructed paragraphs. Choosing the right word is important; arranging the right words in a meaningful pattern is fully as important.

A reader, all too often, is puzzled by the problem of what his engineer-author is saying. He is being asked to organize the engineer's materials, to discover the topic sentence in a paragraph that may contain none, to trace the logic in an incoherent portion of a report.

Clarity may be hard to come by, but it is a precious commodity, and it is by no means impossible to define. We certainly know when something is unclear. Above all, the engineer should know that, since the technical report is frequently the only way in which he may communicate to others the results of his work, it can determine his status and his responsibilities within his organization, not to mention his salary. For management, it is frequently the best measure of his abilities. A man who writes clear reports is obviously a man who thinks clearly. He has learned to care for the English language as potentially the most valuable of all his engineering tools.—**End.**

A photograph of the subject of the report, such as the one shown here, would be worth many words to the reader.

A well-written report will describe in a few words a project that might have taken hours to conclude.

**The Engineer at Work**

# FROM WASHINGTON

BY
MILTON F. LUNCH,
*N.S.P.E.'s Legislative Counsel*

## FEDERAL PERSONNEL STUDY COMMISSION MAY RE-OPEN ENGINEERING CLASSIFICATION QUESTION

FROM the time President Garfield was assassinated by a disappointed job seeker, triggering the creation of the Civil Service Commission in 1883, the agency (not unlike others) has grown into a complex of personnel, regulations, standards, criteria and the other standard accouterments of bureaucracy. A newly-appointed Civil Service Commissioner, Roger W. Jones, formerly with the Bureau of the Budget and not a novice to red tape, was reported to be amazed at the size, scope and complexity of the "Federal Personnel Manual," the "bible" of Government personnel officers. Some leading members of Congress have declared that the Civil Service Commission is smothering in its own internal workings to the extent that Federal personnel management should be turned over to a single personnel director directly under the authority of the President.

◄ Maurice H. Stans

Rep. Tom Murray ►

In fairness to the Civil Service Commission, however, the maze of red tape is not all of its making—Congress has played its part. Today there are sixteen Federal salary systems established by law, plus sixty-one administrative pay systems in the Federal structure. No comprehensive review of Federal civilian pay policies has been made for nearly forty years, and during that period, the number of Federal employees has risen from 390,000 to more than 2.3 million and the payroll to $13 billion. No present policy exists for the coordination of the many pay systems and policies. Federal pay practices are inconsistent and inequitable to the point that supervisors may and often do receive smaller salaries than those under them.

The above points of present-day deficiencies are extracted from a letter to the Senate and House from Maurice H. Stans, director of the Bureau of the Budget, transmitting Administration-sponsored legislation to create a 15-man temporary high-level study group, to be known as the Commission on Federal Civilian Employees Compensation Policy. The legislation has been introduced by Representative Tom Murray, chairman, and Edward H. Rees, ranking minority member, of the House Committee on Post Office and Civil Service. It is generally accepted that Congress will approve the idea of a special study commission. Under the Administration bill, membership on the Commission would include one member from the judiciary, three from the executive branch, three from private life (appointed by the President), four members of the Senate and four members of the House. An earlier bill for the same purpose by Representative Richard E. Lankford of Maryland proposes three representatives of employee organizations rather than from private life.

The Commission's primary instruction would be to develop a general policy for the compensation of civilian personnel of the Federal Government, including criteria and standards for the number of compensation levels, salary ranges, and the need for special compensation systems. The Commission's report would be due by February 15, 1961.

It logically follows that if Congress establishes the Commission it forecloses any substantial legislation on the subject until the recommendations and supporting data are submitted. For engineers in the Federal structure, if not for the engineering profession

generally because of the impact of Federal personnel policies on private and other public systems, the high-level study poses significant possibilities. It is becoming increasingly evident that something needs to be done about the classification and status of engineers and scientists in the Federal service as technology assumes a commanding role in Government policy and operations. To date the "something" has been makeshift expedients which may solve an immediate problem, but generally create new complexities in their wake.

Example: In order to compete with private employers for needed engineers and scientists the Civil

◄ Rep. Richard E. Lankford

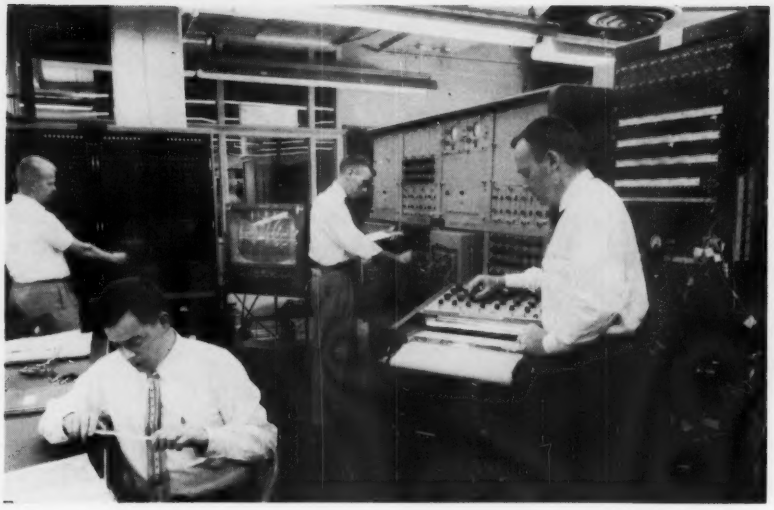
Service Commission employed its authority to raise the key personnel rates to the top step of the grade. Congress passed the ten per cent pay raise last year (including the engineers and scientists who had been put at the top step, despite the opposition of the Commission). Then the Commission found that because the agencies' recruitment rate for engineers and scientists had picked up to nearly that of private employers (partly because of the pay raise and partly because the economic turndown made the Government look a little better as a prospective employer) the top step of the grade authority should be rescinded for new employees, and those promoted to higher grades. The result has been that two engineers, of the same grade, working side by side, doing the same work and having the same title may be paid at different rates. The difference may be only a few days—one hired or promoted before June 20, 1958, and the other after that date. An actual case reported to NSPE shows GS-11's hired in April and May, 1958, are now being paid approximately $700 more than those hired recently. One of those involved was due to be hired before June 20, 1958, but one of his children contracted measles and he was unable to go on the payroll until after the change-over date. His reported comment was: "Wow, that case of measles cost me $700 per year." Of two GS-12's, the one with the greater potential and who acts as a division chief is paid $720 less than the other because of a small difference in dates of promotion.

The Commission admits the inequities in the situation but contends that it cannot continue the top step of the grade authority in effect so long as the agencies are getting their fair share of prospects in engineering and science. The authority in the law is to aid the Government recruit key people, not to solve personal cases of injustice, the Commission feels. There is real merit in the Commission's point of view under the present law.

NSPE has contended for some time that the solution to these problems in the Federal personnel area lies in the creation of a separate schedule for professional engineering employees, recognizing that the role of engineers and scientists is not and cannot be equated in personnel administration with clerical and administrative employees. It is obvious that the problems indicated above would not exist if the system permitted needed salary adjustments within a schedule designed for professional employees. Legislation to return to a Professional Schedule, which existed before 1949 and which was abolished then on the basis of a Hoover Commission recommendation, has been offered for a number of years by Representatives John E. Moss and Charles S. Gubser, both of California. The House Civil Service Committee has not seen fit to act on these proposals, nor has the Senate Committee shown any interest in similar proposals in the Senate. Among the many reasons for the lack of interest in the Moss-Gubser idea is the problem of restricting the coverage. The bills themselves propose a general professional grouping, ranging from accounting to zoology. In addition to engineers and scientists, the proposed schedule would cover military intelligence agents, geographers, psychologists, medical doctors, patent examiners, and a host of others. The cause was not helped, either, when a House Subcommittee did receive collateral testimony on the Moss-Gubser bill, in connection with a pay raise bill, and a parade of witnesses from a miscellany of groups said they "wanted in." Proposals were made to add various subprofessional and technician categories by one of the "supporting" organizations. Chairman Murray of the House Committee has advised NSPE pointedly that it will be necessary to limit the scientific and professional classifications "and at the same time eliminate the considerable clamor from those who are left out of the bill . . ." before serious consideration can be given to such proposals. Congress has been generally reluctant to limit Federal positions on the basis of education and/or licensure, but such an approach may be the only method to create a professional grouping within reasonable bounds.

These are some of the considerations which the proposed study Commission will deal with, it is hoped. While there is no certainty that the proposed Commission would give adequate study to the unique relationship of engineers and scientists, it is noteworthy that in the President's message last year he made reference to the earlier studies in the professional-technical field, such as those of the Cordiner Committee on Professional and Technical Compensation and the Committee on Scientists and Engineers.

At the recent NSPE Board meeting in Birmingham, the Functional Section for Engineers in Government recommended, and the Board approved, NSPE endorsement of the high-level study. Chairman Leonard N. White of Arkansas advised the Board that the study could open the long-closed door to a complete re-evaluation of the role of the engineer in the Federal service—a role which consciously or unconsciously relates to the final decisions on national budget, defense, and international posture in a tense world.



Shown are engineers in the analog computing center at Minneapolis-Honeywell. Engineers in the company, who for some time have had their own "sounding board" type of organization, have now made their group a division of the Engineers-in-Industry Section of the Minnesota SPE.

# Honeywell Engineers' Club Affiliates with Minn. SPE


By

**J. T. LUDWIG, P.E.**

*Minneapolis-Honeywell Engineer and Member, NSPE Engineers-in-Industry Subcommittee*


THE first affiliation of an industrial "sounding board" type of organization with an NSPE constituent society has been made in Minnesota. About a year ago the National Society adopted a statement of policy encouraging such affiliations. Discussion and legislative action by the Minnesota SPE Board of Directors resulted in the organization recently of the Honeywell Engineers' Club, a division of the Engineers-In-Industry Section of the Minnesota Society.

Although other areas may look upon this affiliation as an example of the NSPE policy on sounding boards, some of the details of the affiliation are the result of particular local conditions and might be inappropriate in other areas. One of these local conditions was the recent division of the Minneapolis Chapter of the Minnesota SPE into four parts: three suburban chapters and a core city chapter. This made the affiliation of the Honeywell Engineers' Club (H.E.C.) with a local chapter illogical since the residences of engineers and locations of Honeywell plants are spread throughout the metropolitan area. For this reason the affiliation was considered in terms of the State Society.

Within the Minnesota SPE are two types of chapters, the basic geographical chapter, and the field-of-employment chapter also referred to as "sections." Membership in the sections is voluntary. The oldest section is the Engineers-In-Industry (E-I-I) Section which superseded the State Engineers-In-Industry Committee several years ago. Although some thought was given to setting up a new Honeywell Section, the local, state, and national officers and committeemen thought the existing E-I-I Section should be ultimately converted into a coordinating council with representatives from each of several industrial "divisions." In addition, there is planned an "at-large" division for engineers-in-industry employed by companies not having E-I-I divisions.

After the general proposal was formulated, an amendment to the Minnesota SPE was drafted to permit the establishment of the E-I-I divisions. In essence the amendment would permit non-members of NSPE to belong to the E-I-I divisions, but it requires that the E-I-I council representatives of each division be NSPE members. This amendment was recommended by the State Board of Directors and adopted last February at the annual State convention.

The E-I-I section then got busy with its share of the legislative chores. The section retained its individual membership and simply added two representatives from the proposed Honeywell Engineers' Club Division to the E-I-I Board until another division is formed. When another E-I-I division is formed the present structure will probably be abolished in favor of a council-type section in which each division will have two repre-

Shown are aeronautical division research engineers at Honeywell discussing a problem with models and paper. Under a new arrangement, engineers will work closely with Minnesota SPE and the NSPE.

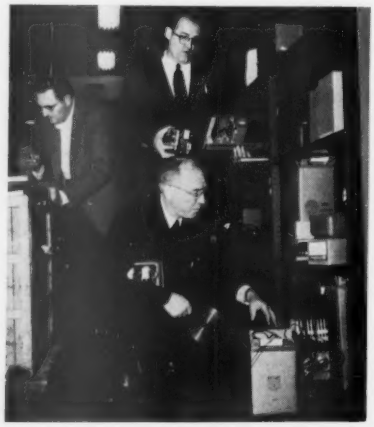
sentatives. This will give a working council initially of six representatives, two from each industrial division and two from the "at-large" division.

Throughout this period H.E.C. had an "exploratory committee" working with the Minnesota SPE. This committee drew up amendments to the H.E.C. Constitution. These provide for election of the E-I-I representatives and for payment of additional dues by NSPE non-members for subscriptions to the AMERICAN ENGINEER and some Minnesota SPE publications. These amendments were then adopted by meeting action and a membership referendum. The Minnesota SPE amendment provided for the final action by the State Board of Directors taken last November.

The affiliation plan does not provide for a compulsory percentage of each E-I-I division to be NSPE members or to become members within a fixed time limit. It is expected that NSPE non-members affiliated with engineers-in-industry sections will affiliate themselves with NSPE. The State bylaws require annual reporting to the State Board of Directors on the status and progress of each division in making its members full members of NSPE.

This policy of open membership may lead to further consideration of the relationship between NSPE and the "industrial scientists"—the individuals, with basic science educational backgrounds who do work similar to the engineers-in-industry. The H.E.C. has a significant number of scientists in its membership. Other "sounding board" organizations, which affiliate with NSPE constituent societies, will probably include scientists, too.

A program similar to the one that led to the H.E.C. affiliation with Minnesota SPE is being studied by the General Electric Evendale Engineers' Association which is planning affiliation with the Cincinnati Chapter of the Ohio SPE. —End.



The Honeywell Engineers' Club has long been active in many worthwhile programs. Here science teachers select surplus items at H.E.C.'s scrap-aid distribution.

*An Evaluation and Proposal*

# The Needs in Engineering Education

By

**NORMAN N. BARISH**

*Associate Dean, College of Engineering, New York University*

IF we are to meet the engineering needs of the future, it behooves us to examine critically the educational patterns which have developed over the years for training engineers. We should evaluate how they meet present day requirements in the engineering profession as well as the conditions we may expect in the profession in the future.

### Range of Occupations Included In the Field of Engineering

What is engineering? Who is an engineer? The term engineering covers a wide gamut of activities. This complicates considerably the problem of defining the field and of establishing the best educational pattern to meet requirements of the various types of engineering positions.

The census usage of the term engineer is considerably looser than those accepted by the professional engineering societies in their requirements for membership or by the state boards of professional registration in their requirements for registration as professional engineers. The census generally follows industry usage. The state professional registration requirements are stricter than the professional engineering society membership requirements. Industry, however, does not make the distinctions which the professional registration boards and the engineering societies make in considerations of their requirements for engineering talent.[1]

We may distinguish at least two ranges of activities in the engineering field: one range might be called a professional practice engineering spectrum and the other a research engineering spectrum.

At one end of the professional practice engineering spectrum, we have technicians who essentially spend a major portion of their time working at subprofessional technical work. In the middle, we have the professional engineer who performs a very competent service in applying existing engineering technology to accomplish the tasks and objectives which are brought to his attention. Proceeding further along this range of professional engineers, we can distinguish a group who excel by having unusual analytic abilities and outstanding design creativity.

At one end of the parallel spectrum with respect to research engineering, we have the laboratory technician and research aide. Then we have the engineers with research orientation. Then we have the truly outstanding research engineers who have the ability to handle unusual problems and will generally have a high degree of mathematical and scientific orientation, at least for those research activities which are connected with most of the newer technologies.

### Widely Divergent Training Patterns

**We are thus talking about a wide gamut of occupations and activities when we speak of the engineering field. As might be expected, the training patterns for such a wide range of activities will vary greatly. Thus, of the 520,300 employed engineers reported in the 1950 census, 12.2 per cent had not completed high school and 45.5 per cent had not completed four years of college.[2]**

There is also a wide divergence of educational background among engineers doing the same kinds of work. This divergence applies to all types and levels of engineering work. A 1946 study of Engineers' Joint Council presents statistics which indicate that engineering work of all types and levels are performed by persons with all different levels of educational experience. Nongraduate engineers, bachelors, masters, and doctorate engineers occupy all types of positions in the engineering field.[3]

High school and/or technical institute training contribute much to our manpower resources at the lower levels with the assistance of on-the-job training. Undergraduate engineering programs provide the bulk of our engineering talent at all levels. Doctoral programs, in mathematics and science as well as in engineering, provide much of the talent for the top levels, especially in the research engineering spectrum.

### Engineering Education Primarily Undergraduate

Education for the vast majority of jobs or positions in these broad spectra is thus primarily undergraduate.[4] Since 1949, the number of bachelor's degrees in engineering awarded each year has varied between 20,000 and 48,000; the number of master's degrees awarded has varied between 3,700 and

[1] Industry also uses the term engineer as part of the occupational title of persons who operate various machines and equipment such as powerhouse engineer, stationary engineer, marine engineer, etc. These jobs are part of different spectra and are excluded from our considerations here.

[2] Blank, David M. and Stigler, George J., The Demand and Supply of Scientific Personnel, National Bureau of Economic Research, 1957, page 88.

[3] Fraser, Andrew, The Engineering Profession in Transition, Engineers' Joint Council, 1947, page 26.

[4] Ibid, Table 1.8k, page 26.

5,100; and the number of doctor's degrees awarded has varied between 420 and 610.[5] Master's degrees have remained below twenty per cent of bachelor's degrees in any year and doctorates have remained below three per cent of the bachelor's degrees in any given year.

With quite a degree of variation, in both quality and emphasis, the undergraduate programs in most engineering schools are usually oriented toward professional practice in specific fields of engineering. Some of the graduate programs leading to the master's degree in the various branches of engineering are oriented toward professional practices; others are oriented towards research; and most have elements of both orientations. The doctorate programs, however, are generally oriented towards research objectives.

### Severe Shortages in Advanced Engineering Fields

A number of surveys have been made in recent years to gauge the demand for engineers. Finding a reliable and valid method for statistically determining such demand is an almost insurmountable task. Engineer requirements vary widely with changes in the defense program and with economic conditions. Surveys frequently exaggerate the demand because employers in a tight labor market are inclined to try to overhire for two reasons: safeguarding against prospective staff losses and inability to obtain their full quota of the graduates for whom they apply. Labor pirating, of course, promotes this condition. Nevertheless, the surveys reveal important qualitative facts about the engineering manpower picture.

In recently released surveys of engineering shortages, a substantial proportion of the companies report that they need men with more advanced training or better professional qualifications. The qualifications and training most desired are in the special fields of technology which are advancing most rapidly at the present time.

In July, 1955, a report was released by the National Science Foundation stating that the supply of qualified research scientists and engineers falls far short of industry needs. Included in this report was the following:

> At one leading machinery company, whose lack of qualified personnel had made it impossible to expand the research program at the planned and budgeted rate, the official interviewed emphasized the inadequate supply of personnel with the technical training and professional qualifications needed by his research organization. He stated that out of 250 candidates for employment recently interviewed, the company was able to hire only three or four with the required technical and professional qualifications. In contrast, the president of another major firm in the same industry stated, since the company is a very well-known, well established organization and has a fine recruiting system, they do not have manpower shortages; he said they pay well and are able to develop the talent they have at a normal and healthy rate . . . Of the eight companies interviewed in the motor vehicle and equipment industry, only one reported difficulties in recruiting needed engineering personnel. . .

This quotation indicates that the critical shortages are only in some of the top level occupations.

The reported results of the 1956 survey of the Engineering Manpower Commission give added support to this view of industry's needs. The following statistics are quoted from this survey:

**Employment During Year From Current Classes**

| | *1955 Actual* | *1956 Expected* | *1956 Required* |
|---|---|---|---|
| Bachelors | 8,086 | 11,343 | 14,524 |
| Masters | 747 | 1,119 | 1,429 |
| Doctors | 384 | 600 | 964 |

On a percentage basis this table reveals the following:

| | *Additional 1956 Requirements as a Percentage of 1955 Actual* | *Additional 1956 Requirements as a Percentage of 1956 Expected* |
|---|---|---|
| Bachelors | 80 | 28 |
| Masters | 91 | 28 |
| Doctors | 151 | 61 |

The shortage is especially strong at the doctorate level and this will grow more and more critical in the long range future.

Further evidence of the extensive shortage of engineering personnel at the top levels, as well as the failure of current educational patterns to provide enough qualified candidates at these levels, is provided by the relatively large number of persons in top engineering positions in the newer technologies who received their formal academic training through the Ph.D. in science and mathematics. This is especially true in the electronics, nuclear, and missile fields.

### Future Technological Growth and Demand for Engineers

We are living in an age of rapidly advancing technology. Scientific discovery and achievement are progressing at an accelerating pace. All indicators point to increasingly rapid technological advance in the future.

In the field of transportation, developments in our future modes of travel will no doubt be spectacular. Jet powered planes will drastically cut air travel time. The problems of space travel will be conquered within the not too distant future. New petro-chemicals, new metals, such as titanium and zirconium, new plastics, new dyes and insecticides will be developed and will come into more common use in larger quantities in the future. Electronic computers will be further improved to increase their usefulness to new industrial control and information processing and transfer functions. Ultrasonic devices are being developed for detection and other industrial purposes. Automation is and will continue to grow as an important factor in our economy. Advances in harnessing atomic energy will open many new vistas in numerous fields, including power generation, transportation, food preservation, medical research and treatment, industrial process control and inspection, etc.

Developments such as these will continue into the future. Requirements for the services of engineers in these new technologies will also increase at a very rapid pace. The critical needs in these new fields will be for engineers at the upper levels of our engineering spectra. The great demands will be for engineers who possess great flex-

[5] Journals of the American Society of Engineering Education.

ibility in approaching and solving the original and challenging problems posed by these new technologies. More thorough grounding in mathematics, science, engineering analysis and design becomes increasingly important for the engineers who will meet our needs in these fields.

### Overloaded Undergraduate Curricula

Engineering schools throughout the country are bursting at their curriculum seams in attempting to cram into the traditional four-year baccalaureate period the mathematics, science, humanities, and professional engineering training which is required for top caliber engineering performance in the modern technologies.

A sizeable proportion of the students who successfully complete our current bachelor of engineering programs take more than four years to accomplish this work. Thus a recent study on the academic progress of individual students who entered as engineering freshmen in 1948 disclosed that one-third (33 per cent) of the entrants graduated in four years from engineering or had completed satisfactorily four years of a five-year program of study. Eleven per cent of the entrants were still enrolled in the fall of 1952, it being estimated that most of these would graduate by June, 1953.[6] This would indicate that almost a quarter of the students who successfully complete the four-year program take more than four years to do it.

Further evidence is provided by another survey which indicates that the average number of years to obtain a bachelor's degree in engineering is presently 4.7 years.[7]

All this shows that we are attempting to cram into a four-year undergraduate engineering program more than it is possible to accommodate. There are several approaches to this dilemma. One is to eliminate some of the course content in the engineering curriculum and another is to improve the preparation of the students before they enter professional engineering school.

It is not feasible to delete any significant amount of material from the engineering curriculum without seriously reducing the value of the educational program in meeting industry's needs, unless the material which is to be deleted is made prerequisite to entrance into the engineering school. Surveys and studies of engineering education in recent years have all emphasized the importance of improving and strengthening work in the basic sciences, the engineering sciences, the study of engineering analysis, design, and engineering systems, as well as increasing and improving the content in the humanities and the social sciences. All these have created pressures for additions rather than deletions in the engineering program. This would seem to indicate that what is needed is an extension of the number of years in professional engineering school. This notion has been adopted by a few engineering schools in the country who have inaugurated five-year programs for the bachelor of engineering degree.

**The answer thus cannot be to eliminate some of the present content unless at the same time this content is moved into the prior education of the student as prerequisite to his admission. Raising the entrance requirements can be accomplished successfully only if provision is made that students will be available with the higher entrance requirements. Improving the preparation that high school students receive in the fields of mathematics and science is certainly one step in this direction which can prove of great value. However, the extent to which this can be expected to alleviate the problem in the near future is very limited. Another alternative, and the one proposed later in this article, is to require some post-high school collegiate training prior to entrance into engineering school.**

### Early Professional Specialization

Engineering education tends to be very highly specialized. (Specialization is used here to refer to concentration on professional practice in a particular field of engineering as well as concentration on the special technologies useful in the particular field.) By his junior year a student is usually established in a professional program designed to prepare him for work in one field of engineering. His master's work will generally provide more specialized coverage in a more restricted area. Some doctorate programs provide even further specialization whereas others provide basic training which is fundamental to many fields of engineering.

Thus, we tend to specialize very early in our program in engineering education. We tend to be impatient with attempts to build the engineering courses on a foundation of engineering science. We frequently attempt to teach our engineering courses with as little mathematics and science as possible. (This is not meant as a criticism. In fact, this is undoubtedly the proper training pattern for most elements of the spectra previously mentioned.)

In this connection, a brief comparison with the educational pattern in the medical profession may be of interest. The undergraduate training prerequisite to entrance to the graduate medical school is broad in scope and encompasses the basic sciences important to the practice of the medical profession. In medical school, the four years leading to the professional doctorate are devoted to the fundamentals of medical science and practice. Training as a specialist in one or more branches of medicine occurs at the post-doctorate level, usually in close conjunction with medical practice.

These are important arguments for avoiding early specialization in some engineering education. These arguments are especially valid and logical for the training of people for the work at the upper levels of the profession where the most critical need exists at the present time. Training in fundamentals provides the engineer with greater flexibility and with an improved capacity for solving new and unusual problems. Early specialization at the undergraduate level reduces the possibility of including large amounts of mathematics and basic engineer-

[6] Four-year follow-up study of 1948 freshman entrants to engineering colleges, Educational Testing Service, Princeton, New Jersey, February, 1953.

[7] U. S. News & World Report, January 24, 1958, page 78.

ing science in the educational program.

By concentrating on fundamentals in certain parts of our engineering education program, we can give our students and industry certain additional advantages. A substantial percentage of engineering graduates do not practice for any length of time in their field of engineering specialization. Excluding those who leave the field of engineering completely,[8] only a portion of those remaining in engineering stay in the field of their original training. Concentrating on fundamentals improves the flexibility of the man and improves the transferability of his education to other engineering fields.

There is still another more important reason for avoiding early specialization and concentrating on engineering science and fundamentals. We are always training for the past. The technologies of the past continue into the future, of course, and we will need engineers trained in these older technologies. However, we have a most urgent need to train men who will work in the new technologies which have not yet been developed or are only in the process of being developed. We cannot possibly give students specialized training in new technologies which have not been developed. The most suitable training for these men involves programs emphasizing engineering science and fundamentals.

### Limited Source of Doctoral Students

Our present sources of students for our doctoral programs in engineering is very much limited and restricted. Outstanding non-engineering college graduates are discouraged or are eliminated from this available pool. Let us consider that a man can go to a liberal arts college, major in science, and, after receiving his bachelor's degree, can decide that he would like to go on for a doctorate in engineering. Before obtaining admittance to most graduate engineering schools, he would be required to obtain a bachelor's degree in engineering or complete the equivalent thereof. This would involve completion of two or more years of undergraduate work in addition to the three, four, or five years of graduate work required to obtain his engineering doctorate.

### Proposal for Graduate Professional Engineering Schools

Engineering covers a wide gamut of occupations. Various educational patterns have developed over the years to meet industry's requirements for all types and levels of engineers. The current pattern of engineering education is primarily undergraduate, with emphasis on quantity and uniformity of level of performance. The great bulk of industry's quantitative needs are met by this pattern.

The smaller numerical needs for the top level engineers are not as adequately met and for these needs the present patterns are not well designed. The severe shortages in engineering today are in the advanced engineering fields. In addition, the future technological growth and demand for engineers will be for engineers at these upper levels.

Our future welfare depends on our ability to produce more engineers with unusual talents rather than the total quantity of all kinds of engineers. The talents which we desire most are fostered to the greatest extent in graduate training programs leading to the doctorate. Our present sources of students for doctorate programs in engineering are limited and restricted. Thus, an increase in a number of educational paths for producing top level doctoral candidates in both engineering science and engineering practice appears desirable.

Establishment of graduate professional engineering schools can provide an answer to these problems. These schools would not replace the present patterns of engineering education, but would function in parallel with them. The presently established educational avenues for undergraduate and graduate work in engineering would continue to provide most of the engineers we need.

These graduate professional schools would provide a three or four year program leading to a professional doctorate, which would be open to qualified students regardless of whether they had any particular degree. They would offer a program emphasizing engineering fundamentals.

Admission to this school would be based upon attainment by post-high school training of proficiency in specified areas of mathematics and science, as well as coverage of the humanities and general studies. This might involve two, three, or four years of undergraduate work in liberal arts and science, depending upon the programs of study taken by the student and his abilities, aptitudes, and maturities. Most students would obtain a bachelor's degree prior to being admitted to the graduate professional engineering school. Some students might also enter this school with an undergraduate engineering degree.

Students would not be admitted to this graduate professional engineering school until they were thoroughly prepared in mathematics and the basic sciences. The liberal arts pre-professional schooling would thus be devoted to bringing the student to a specified level of attainment in mathematics and the sciences as well as to providing a liberal education in the humanities and general studies. The pre-engineering college education in the liberal arts and sciences will provide some of the cultural foundation to assist in "the cultivation of the thinking man—to nurture to the fullest extent possible the development and enrichment of the individual mind; to develop the individual's ability to seek and comprehend facts; to judge them in terms of implications and issues; to weigh and evaluate his findings and isolate alternatives; and to relate what he learns to his ideals, beliefs, and values." [9]

It will, of course, be necessary to develop evaluation procedures to enable the proper screening of prospective students. The undergraduate performance of pre-engineering students in college mathematics and science will provide additional evidence to assist in this selection of the superior students

*(Continued on page 39)*

[8] Estimates vary on the number who leave the engineering profession. In 1940, there were 226,000 living engineering graduates, but the census reports only 156,000 engineers with 4 or more years of college. Apparently, more than 30 per cent of the engineering graduates considered themselves outside the engineering profession.

[9] From talk by Henry T. Heald, reported in Mechanical Engineering, January, 1958, page 110.

# Fundamentals of Unity

## *What is Needed and How it Can Be Obtained; a Discussion of the Past and Future*

By
**GARVIN H. DYER, P.E.**
*Past President, NSPE, and*
*Chairman, Inter-Society Relations Committee*

THERE is much confusion concerning the meaning of the term "unity" as related to the engineering profession. It has been much bandied about. It means entirely different things to different people. Wishful thinking would lead us to believe that if we set up some over-all organization in which all engineers might in some manner have representation and give it a high-sounding name indicating unification, we have accomplished unity of the profession. Experience has taught us that such is not the case.

The first fundamental to consider concerns the defining of what we mean by the term "unity" as it is used relative to the engineering profession. In this sense, the term really means the bringing together of the thinking, activities and objectives of individual engineers into common action so that the profession may present a united front in matters of public concern and professional advancement and, at the same time, better the engineer's own welfare and enhance his value to the public. The engineer's training dictates to him that this should be accomplished in the most efficient manner.

### Evolution of the Functional Plan

A successful unity organization must first of all be able to efficiently fulfill the needs of the individual engineer in light of what is in the best interests of the profession as a whole, as well as the general public. In order to better understand what we mean by unity, let us consider what these needs are. We find they fall into three rather well-defined groups: educational needs, technical advancement needs, and professional needs. The engineer long ago recognized these needs and organized societies to look after them for him. However, these societies were organized in accordance with the technical branches of the profession, and it soon became apparent that many interests, especially in the educational and professional areas, transcended such technical fields. He saw that these societies were not organized or financed to permit them to adequately perform in these transcending areas. He recognized the necessity of exercising control over educational qualifications for the entire profession and, as a result, organized Engineers Council for Professional Development (ECPD).

It was also obvious to the engineer that in order for education and technical advancement to be of the utmost benefit to him and to the public, there must also be professional development so that he might best serve the public, that the public be protected from the imposter and incompetent, and incidental thereto, he be properly recognized and compensated for his professional skill. He soon learned that his professional problems were common to all branches of the profession and could most effectively be handled by a grass-roots membership organization including all fields of the profession, adequately financed and with a three-level

Dr. Clark A. Dunn, president of the NSPE (left), greets Arthur M. Kaindl, who holds Illinois P.E. Registration No. 1 (right), while Mitchell J. Alster, P.E., looks on. Messrs. Kaindl and Alster are members of Chicago Chapter of the Illinois Society of Professional Engineers. The registration requirement has figured prominently in unity discussions.

structure, generally paralleling our local, state and national government setup. Accordingly, in 1934, the professional society (NSPE) was born of the dire need of the individual engineer, the profession, and the public.

The engineer recognized a need for better coordination of the arts and sciences of his profession and formed Engineers Joint Council (EJC) as a federation of technical societies. Later it was proposed that EJC act as the unity organization of the profession, but as the engineer studies the fundamental principles inherent to a lasting unity organization it is obvious to him why EJC cannot adequately perform this function. The engineer also realizes that his technical society has certain interests in educational and professional matters in its particular field and can be of invaluable assistance to ECPD and NSPE by advising them of its thinking in these matters. This he wants it to continue to do.

THEN, the engineer finds considerable confusion developing as to his original objective of unity. He finds some of the organizations he has set up doing work in fields in which they are not organized or financed to work in effectively, resulting in his money's being inefficiently used, duplication of effort and further confusion. This he does not like and looks around for some way to organize his profession more efficiently. He recognizes the accomplishments of his technical society, of EJC in coordinating technical matters, of ECPD in educational advancement, and of NSPE in the professional field; and he wishes to hold the ground he has gained by continuing to utilize all of these groups. He also knows that this is a day of specialization and if he is to succeed he must divide his problems up into these basic groupings and refer each to the organization best suited to handle that particular type of problem.

He also finds that in his desire for unity he has actually developed *three* organizations – NSPE, EJC, and ECPD—each a unifying organization capable of performing specific aspects of his professional development.

Out of the confusion emerges the Functional Plan—a simple plan of feasible organization, coordination and cooperation. The Plan merely provides for an ethical agreement that EJC coordinate and speak for the profession on technical matters, ECPD on educational matters, and NSPE on professional matters; thus, eliminating the present waste in duplication of effort and funds. All three bodies would operate on the same level in their specialized fields. If considered desirable, there could be a simple, joint committee of these three bodies to coordinate activities. The Plan does *not* propose that any of the engineering societies give up any of their activities but that they coordinate those items reaching beyond their own fields of specialized service through the three groups listed.

### The One Society Concept

Unity does not have to be attained necessarily through one society, one federation, or any single group. In fact, the lessons we have learned from the principles of specialization would indicate that the most efficient method of attaining "unity" is through better organization and cooperation within existing agencies rather than by setting up any completely new or revamped over-all, all-inclusive, all-powerful society.

No doubt the attainment of the objectives of unity in our profession has been seriously set back by the concept that it can only be attained through a single organization. Certainly, we have made little progress over the years with the "one-society" approach. We pride ourselves on the unity of this nation, but even here our Federal Government is made up of forty-nine autonomous states and is itself broken down into *three independent branches, all independently operating in their own designated fields but coordinated by organization and under the democratic control of the people.* The parallel in principle with the proposed Functional Plan for the organization of the engineering profession is apparent.

To be brutally realistic, the only way the "one-society" idea could be accomplished today would be for *all* engineering societies to disband and the entire profession form into one over-all society. For numerous reasons, it can be pretty well agreed that this would be impractical, to say the least.

### Lessons from the Medical and Legal Professions

Quite often the organization of the engineering profession is compared with that of the medical and legal professions. This is logical because those organizations have many years of experience and have

*(Continued on page 42)*

# Steady Growth of Engineers' Week Shown in 1959 Reports

- Wide Acceptance Given to Many Events
- Chapter, State Projects Summarized

The steady growth of the National Engineers' Week program throughout the 49 States, Hawaii, and the Canal Zone was continued in the 1959 observance. Reports from the local chapters and state societies sponsoring the events of the 1959 Week indicate an increased number of engineers participating, and a wider acceptance of the various projects by the press, by industry, and by the general public.

Many chapter reports received by the Engineers' Week Committee emphasize the career conferences which were held for high school seniors under the sponsorship of professional engineers and educators. One example of this type of project was the career conference held by the Lake St. Clair Chapter of the Michigan SPE in Grosse Pointe Woods. An audience of 300 parents and students attended the session which was moderated by Chester J. Ordon, professor of sanitary engineering at Wayne State University.

The Columbus Chapter of the Nebraska SPE held a career conference for 150 students in an all-day program which included the showing of a film on atomic energy and the firing of several rockets constructed by the local JETS Club. In Columbus, Georgia, a team of young engineering officers from the 151st Engineers Group at Ft. Benning spoke at the local high schools on engineering as a career.

The Lebanon County Chapter of the Pennsylvania SPE awarded a $25 government bond to a high school senior exhibiting the "greatest ability in all branches of mathematics." Fifteen high schools in the area of the Upper East Tennessee Chapter of the Tennessee SPE had engineer speakers during the Week. Five high schools in the Decatur, Illinois area had engineering exhibits set up by local industrial firms. Nine scholarships totaling $2,000 were awarded to outstanding science students in San Francisco as part of a program sponsored by thirty-three engineering societies and industrial firms.

Thirty-six mathematics and science majors from seventeen Onondaga County, N.Y., high schools were guests at a dinner culminating the program sponsored by the Syracuse Chapter of the New York State SPE and the Technical Societies Council of Greater Syracuse. The high school seniors were chosen to present talks to eighth grade classes on the values of science and math courses.

Out in sunny San Diego the big feature of the Week was the 1959 Engineering Exposition in the Electric Building at Balboa Park. The four-day exposition was open to the public and had scientific and technical displays from more than 70 firms. The San Diego Engineers' Week Committee was made up of representatives from 28 engineering societies.

The space age theme for the Week was widely utilized in chapter events. The Anthracite Chapter of the Pennsylvania SPE heard a talk entitled "Our Progress in the

Nebraska's Governor Ralph Brooks turns over the 1959 Engineers' Week proclamation for his State to L. E. Miller, center, president of the Nebraska SPE. Left is W. B. Boucher, and right is R. M. Babcock.

The role of steel products in helping to bring about the space age was the theme of this exhibit on display during the Week at the headquarters of the United States Steel Corporation in Pittsburgh.

Max H. Morris, president of the District of Columbia SPE, holds an Engineers' Week proclamation for Washington. Left to right are Chris M. Lample, chairman of the Week for the District Chapter; D. C. Commissioner David M. Karrick; Mr. Morris; D. C. Engineer Commissioner Brig. Gen. Alvin C. Welling, and S. S. Podnos, 1st vice president of the District Chapter.

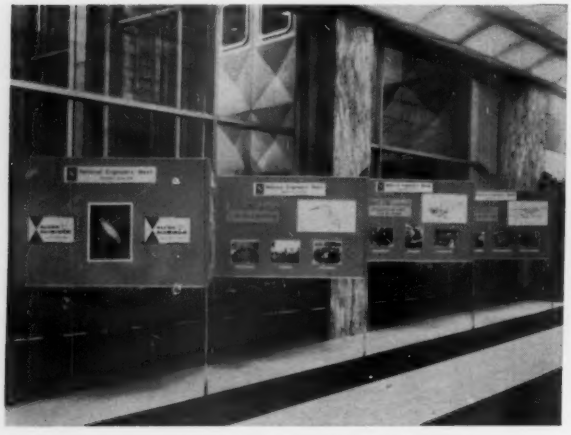
An Engineers' Week session sponsored by the Central Carolina Chapter of the Professional Engineers of North Carolina and the College of Engineering at Duke University brought Major General J. B. Medaris, right, Redstone Arsenal commanding general, to speak at the Durham school. Others shown, left to right, are Col. G. F. Leist, T. C. Cooke, and W. J. Seeley.

Space Age" by Frederic S. Larson, market analyst, Missile & Space Vehicle Department, General Electric Company. Clarence H. Linder, General Electric vice president for engineering, told a banquet audience in Toledo that "space exploration and nuclear development soon will be overshadowed by a tremendous growth of industrialism all over the world."

A radio panel discussion on engineering and the space age was held in St. Louis and included Mayor Raymond Tucker, who is himself an engineer. The Louisiana Engineering Society heard a talk on the increased scientific use of rockets and space satellites by Joseph D. Fleming Jr., a member of the upper atmosphere rocket IGY panel. The Air Force Bomarc supersonic guided missile was displayed in Oakland, California.

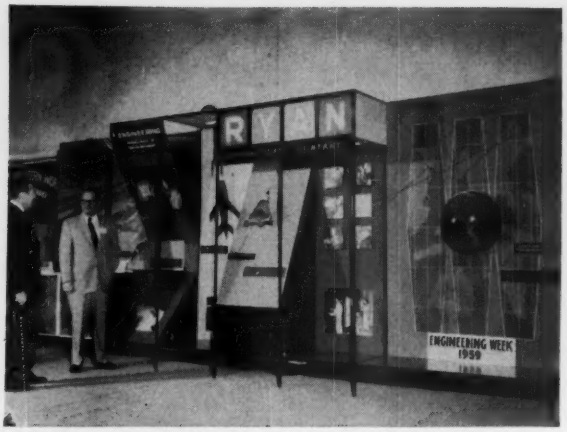
Kurt R. Stehling, a director of the American Rocket Society and head of the Vanguard group, National Aeronautics and Space Administration, told an overflow banquet audience in Wilmington, Delaware, that man would send objects on voyages to the planets and perhaps the nearer stars. The banquet was sponsored by the Delaware Council of Engineering Societies. On the same program, Delaware's Governor J. Caleb Boggs bestowed the title of "Engineer of the Year" on Francis V. du Pont, former chairman of the State Highway Department.

The extensive Engineers' Week



This photo display in the modernistic lobby of Pittsburgh's Alcoa Building was sponsored by the Aluminum Company of America. The display describes the engineering story of bauxite mining, refining, smelting, and aluminum fabricating.

Governor George Docking of Kansas signs an Engineers' Week proclamation while Kansas Engineering Society members look on. Left to right are William F. Ryan, C. H. Scholer, Carl D. Hultgren, Bryce B. Miller, and Donald P. Schnacke.




A Ryan Aeronautical Company exhibit calls attention to engineering in San Diego. The two engineers, left to right, are Eugene A. Balas, and Clurman W. Bibb, members of the San Diego Chapter of the California SPE.

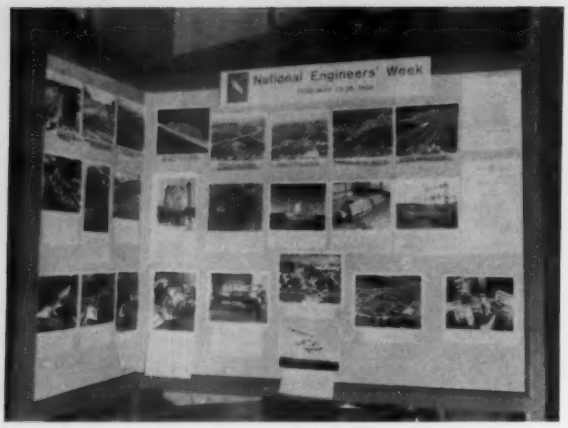
An Engineers' Week press luncheon brings together four committee members of the San Diego Chapter of the California SPE. Left to right are James R. Dempsey, Benjamin R. Alsobrook, Frank W. Fink, and Morton Rosenbaum.

Part of the audience of 800 at the Engineers' Week banquet in the Commodore Perry Hotel, Toldeo, Ohio, where Clarence H. Linder, vice president of engineering for the General Electric Company, spoke on "Engineering for the Age of Space."

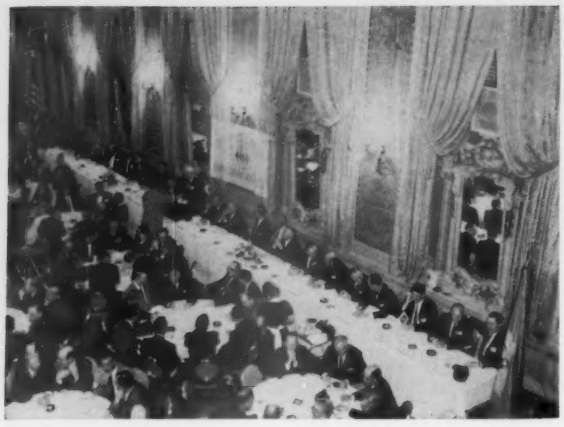
Army missile launching equipment is displayed on Broadway in Columbus, Georgia. The exhibit was sponsored by the Georgia Engineering Society, the Georgia Society of Professional Engineers, and the 151st Engineering Group.

Engineers of the Tullahoma, Tenn., area witness the signing of a proclamation for the Week by Tullahoma Mayor W. D. Parham. Seated are Gordon Walhood, left, and John Gale. Standing are Ray W. Harvey, John Komisky, Ernest Teasley, and R. D. Ramsey, Jr.

Space capsules and guided missiles were featured in this window display in the Boatmans' Bank in St. Louis.




The Hartford National Bank & Trust Company was the scene of this photographic display sponsored by the Hartford County Chapter of the Connecticut SPE.



Some 750 engineers attended this Engineers' Week banquet session in the Gold Ballroom of the Hotel Du Pont in Wilmington, Delaware.

activity in the Wilmington area included talks by engineers to seventeen service clubs, a number of window displays, talks at fourteen high schools, and the showing of a film entitled "Atlas—the ICBM" to more than 2,500 people in plants, schools, and community organizations.

A discussion of the engineering education system in Russia was the topic of a talk by Dr. Ralph E. Fadum, head of the department of civil engineering at North Carolina State College, as he addressed a joint meeting of five engineering societies in the Charleston, S. C., area. J. W. Bond, chief of physics for Convair, told a group of 250 science students in the San Diego area that Russia is ahead in science, mathematics, and engineering.

In Kansas City, Missouri, a Chamber of Commerce luncheon audience heard a talk by George Romney, president of American Motors. A banquet audience of the New Mexico SPE heard a talk by that State's Governor, John Burroughs.

The highlight of the Week for members of the Erie County Chapter of the New York State SPE was a talk by Dr. Wernher von Braun at a luncheon in Buffalo sponsored by the Chapter in cooperation with the Buffalo Chamber of Commerce, the Rotary Club, and the Greater Buffalo Advertising Club.

Dr. Harold E. Edgerton, pioneer in stroboscope development, was named "New England Engineer of the Year" at a luncheon meeting of the Engineering Societies of New England at Harvard University.

Harry Ball, president of the Marion Chapter of the Ohio SPE, is surrounded by six Marion high school students chosen by the Chapter as "Future Engineers of the Year." The students were presented with certificates at a chapter dinner meeting.

The St. Louis Chapter of the Missouri SPE obtained this engineering exhibit in the St. Louis City Hall.

# NSPE Members Approve Dues Increase; Elect Mosher Pres.

## • Results of Recent Balloting Announced

## • Society Officials Hail Dues Vote

NSPE members have approved a dues increase to go into effect with the 1960 calendar year. Those voting in the recent balloting gave approval to the new dues structure with sixty-nine per cent voting affirmatively, more than the necessary two-thirds required under the NSPE Constitution and Bylaws.

The Society voters also elected Harold A. Mosher, Rochester, New York, as its new president to take office July 1. Also elected were W. Earl Christian, Westfield, New

Jersey, vice president, Northeastern Region; R. King Rouse, Greenville, South Carolina, vice president, Southeastern Region; L. E. Easley, Indianapolis, Indiana, vice president, Central Region; Brandon H. Backlund, Omaha, Nebraska, vice president, North Central Region; Noah E. Hull, Houston, Texas, vice president, Southwestern Region; George E. Zelhart, Fresno, California, vice president, Western Region, and Russell B. Allen, College Park, Maryland, treasurer.

Vice Presidents Easley and Hull are serving their second terms in their respective offices and Dean Allen of the University of Maryland will be embarking upon his 12th term as treasurer of the NSPE.

Approval of the dues increase was hailed by Society officials as a great step forward.

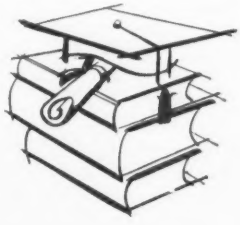
"This step means that members of the Society realize that professionalism requires financial as well as personal support. In the final analysis, it takes money to do all of the things we want to do as a growing organization. I certainly want to take this opportunity to congratulate the membership upon their insight into the needs of NSPE and further, I am sure the Board of Directors and officers will take action at the earliest possible moment to formulate plans to implement programs made possible by these additional funds," Dr. Clark A. Dunn, NSPE president, said at his Stillwater, Oklahoma, home.

Previously announced needs indicate that the additional funds will make possible many of the following:

• ***Increase Public Relations.*** Increase activities for Engineers' Week, including more work in television, films, and supporting material for local chapter and state activities.

• ***Professional Engineers Conference Board for Industry.*** Resumption of the extremely worthwhile research of the engineering profession; what it does, how it does it, and the conditions under which engineers are most effective.

• ***Annual Report.*** Provide for the



continuing publication of this annual report to the members.

• ***Additional Financing of Functional Sections.*** Financial aid for the development of functional sections by which the Society can be more effective in resolving the problems and activities of groups of engineers because of their type of employment.

• ***Ethics.*** Financing of the mechanism for more effective and extensive work in the field of ethics. This work would be conducted through the already established Board of Ethical Review.

• ***Additional Employment Practices activities.*** These funds will be put to work to distribute further material dealing with the employment practices of the engineer in industry as well as to continue aggressive activity to combat unionism of professional engineers wherever it arises.

• ***State Presidents' Conference.*** Support of the most effective State Presidents' Conference so that the

top officials of the state societies can meet to exchange ideas on mutual problems.

• ***Advertising Promotion, Including Staff, Research and Material.*** To enable the American Engineer Committee to further promote the AMERICAN ENGINEER as an advertising medium. During the past two years much progress has been made in establishing the publication in this regard and additional funds will help to continue this effort.

• ***Reserve Fund.*** Monies to be set aside as a cash reserve.

• ***Membership Promotion.*** Funds to be used to gain members for the NSPE through programs which would call NSPE activities to the attention of professional engineers everywhere.

• ***State Secretaries' Conference.*** This badly needed meeting would bring together secretaries at the state level for an exchange of administrative ideas.

• ***Board Per Diem.*** It has been fundamental in the philosophy of NSPE that a state society should be able to select its most capable

*(Continued on page 43)*

# New Literature

**ELECTRIC BLASTING**—Atlas Powder Company announces publication of a "Handbook of Electric Blasting" by David M. McFarland and Guy F. Rolland. The new 60-page handbook makes plain, for novice or experienced blaster, the ways and hows of effective electric blast detonation. Technical terms are explained in such a way as to give the beginner in electricity sufficient knowledge to enable him to use electric blasting successfully. Among the subjects covered are: the advantages of electric blasting over old methods, the nature and construction of an electric blasting cap, and the sources of power for electric blasting. Tables and graphs are given for current delivered by standard blasting machines, resistance of copper wire and caps, and electric blasting circuits. The book describes and illustrates methods of splicing wires, testing circuits, checking current leakage, and the use of rheostats. It is sturdily bound for hard use, and is small enough to fit in a pocket, so that it may be taken out on the job for quick reference.

*(Circle 1 in Readers' Service Dept.)*

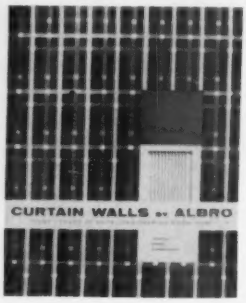
**SPEED DRIVE**—The Louis Allis Company has recently published a 6-page bulletin, No. 2750, on its redesigned Ajusto-Spede drive in ratings of ¾ to 7½ horsepower. The bulletin gives dimensions, engineering information and a cutaway view of this adjustable speed drive that utilizes a stationary field construction to eliminate all brushes, commutators and slip-rings, for reduced maintenance. The drive is suitable for continuous operation at full load (constant torque) in ranges as high as 34:1 and for intermittent use from zero to full speed, or any RPM in between.

*(Circle 16 in Readers' Service Dept.)*

**PAYMENT PLAN** — Vapor Heating Corporation's Bulletin 486 explains how their extended payment plan for Drum Modulatic boilers can conserve working capital for top-profit uses. The folder points out that since cash is a tool of production that should help earn maximum revenue, it is sound business practice to be financially ready to profit from all opportunities.

*(Circle 17 in Readers' Service Dept.)*

**CURTAIN WALLS** — Custom curtain wall systems for all building types are described in a new 12-page catalog available from Albro Metal Products Corporation. The catalog discusses




three series of curtain wall that are adaptable to all architectural treatments. Included are typical sections for large flat panels, designed for the speedy enclosure of medium and high-rise structures; light commercial grid for multi-story buildings; and structural aluminum grid, a versatile system for low-rise buildings. Descriptive paragraphs and project photos give a complete picture of the features and appearances of each of Albro's three basic curtain wall series. Suggested specifications are also contained.

*(Circle 18 in Readers' Service Dept.)*

**GENERAL PRODUCTS** — A new 8-page General Products Bulletin has been published by Roller-Smith, Inc., a subsidiary of Federal Pacific Electric Co. Covered in the 2-color catalog are Roller-Smith's line of electrical indicating instruments, and distribution and control equipment. Included are: oil circuit breakers (from 50,000 to 250,000 interrupting kva); subway switches (from 800 amps to 50,000 kva interrupting capacity, both weatherproof and submersible, manually and electrically operated); precision balances; rotary switches; and panel, switchboard and portable instruments. Photographs of typical devices are included, and construction features are described in detail. Information on applications is also supplied. General Products Bulletin 3-610 is 8½ x 11 inches in size and three-hole-punched for convenience.

*(Circle 19 in Readers' Service Dept.)*

**LAMP BALLAST** — Advance Transformer Company has announced an improved Fluorescent Lamp Ballast in a single container for (2) 96″ or (2) 72″ SHO, VHO or Powergroove Lamps. In the past, this ballast has been supplied in twin containers as a ballast and auxiliary. The new construction is forty per cent smaller and forty per cent lighter. In addition, the ballast has a perfect sine wave shape with a 1.4 crest factor that assures 100 per cent light output plus full, rated lamp life, it is claimed.

*(Circle 20 in Readers' Service Dept.)*

**AEC DRAWINGS** — The latest engineering and industrial drawings with related specifications for nuclear applications are now available from Cooper-Trent, blue print and microfilm corporation. This new material has been developed by the U.S. Atomic Energy Commission and its contractors and Cooper-Trent has been engaged to provide copies of these drawings. Free literature and prices are available. Reproductions are available from original 105mm Micro-Master negatives, identical to those furnished AEC for this use.

*(Circle 21 in Readers' Service Dept.)*

**BRIDGE RAILINGS**—A printed folder containing complete drawings and specifications on aluminum bridge railings and accessories has been published by Reynolds Metals Company. Of special interest to highway and construction engineers, the twenty-six separate drawings are printed on tracing paper for convenient use.

*(Circle 22 in Readers' Service Dept.)*

**ELECTRIC-EYE** — Photomation, Inc. has recently released a new 6-page bulletin which covers important developments in design and application of miniaturized "electric-eyes." This new material is of special interest to designers, engineers, and production men. Included in the bulletin is a direct comparison between the color range of the human eye and the "electric-eye." Also included is a detailed description of application, construction and schematic drawings illustrating range of installations. Operations of the units are discussed in detail.

*(Circle 23 in Readers' Service Dept.)*

***These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in this column, merely circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.***

# Science, Engineering Merger To Highlight 25th Meeting

- Two Important Presentations Planned
- Mayor Wagner to Welcome Members

A convocation on "The Merging Role of Science and Engineering" will be a feature of NSPE's Silver Anniversary meeting in New York, June 17-20. The subject of the convocation is designed to focus attention on this important aspect of the "Space Age."

Along these same lines, the 1959 Engineers' Week theme, "Engineering . . . for the Age of Space," has also been adopted as the meeting theme.

Other significant highlights on the agenda for the three-day session at the Hotel Commodore include: (1) Presentation of the 1959 NSPE Award to an engineer for outstanding service to the profession, and (2) Recognition of the engineering "Ambassador" who will be given an all-expense paid trip for two to a foreign country. The latter individual will be chosen in connection with the Society's fund campaign.

The official program for the 25th annual meeting will be released next month, but early reports from the New York State SPE indicate that this will be an outstanding affair.

Following professional meetings on the afternoon of June 17, Mayor Robert F. Wagner of New York will welcome members at the opening dinner. Dr. Clark A. Dunn, NSPE president, will also give his "State of the Society" message at this event.

Thursday, June 18, will be devoted to professional meetings, with the convocation on "The Merging Role of Science and Engineering" planned for the following afternoon. James F. Fairman, vice president of Consolidated Edison Company of New York, Inc., will moderate the session, which will include a well-known industrialist, Clarence H. Linder, vice president of General Electric Company, and an outstanding educator, yet to be named.

Also scheduled on the Friday program will be functional section meetings of interest to engineers in private practice, government, and industry.

**Meeting Headquarters**

The Hotel Commodore, adjacent to Grand Central Station, will serve as the site of NSPE's Silver Anniversary meeting, June 17-20.

James P. O'Donnell, chairman of the functional section program for the Engineers-in-Private Practice, has announced the names and subjects of some of the participants for his group. Harvey Pierce will discuss "The Functional Section in Proper Perspective;" J. L. Breeze, "Duties and Responsibilities of a Principal in a Consulting Engineering Firm;" F. Sanford, "Let's Be Realistic on Fee Percentages," and the Michigan SPE will give a joint

**Downtown Skyline—Night View**

The blazing lights of the offices housed in the skyscrapers of lower Manhattan appear like jewels suspended in air to a person across the bay on Governors Island.

## Brooklyn Bridge

This was the first suspension bridge to be built in the New York area, being completed in 1883 at a cost of $25 million. Now open to foot and automobile traffic exclusively, it once carried buses, trolley cars, steam engines and elevated trains across its 6,016 feet of expansion over the East River. It was recently redesigned and renovated by Dr. David B. Steinman, first president of NSPE.

paper on "Ways of Presenting the Consulting Engineer's Story."

In addition, four other engineers will present comment papers on the above subjects.

**On Friday evening, the host New York Society has obtained a block of orchestra seats for the musical play, "The Music Man." These tickets are available to out-of-town members at the box office price of $8.05 per ticket. Reservations for these tickets, which must be made by May 15 together with a check or money order, should be sent to: NYSSPE, 1941 Grand Central Terminal, New York 17, New York, Attention: S. Kalver.**

Also from the social standpoint, many members are no doubt planning their vacations to coincide with the meeting dates.

High in popularity for the visitor are those world-famous symbols of New York, the Empire State Building, Rockefeller Center with its impressive Radio City Music Hall, the United Nations, the Statue of Liberty, and Times Square. The Empire State Building, the outstanding example of New York's famed skyscrapers, welcomed 1,400,000 people to its observation towers in 1958.

The closing day, Saturday, June 20, will feature an address by Dr. David B. Steinman at a luncheon in honor of past NSPE presidents. The official twenty-five year history of the National Society will be distributed in printed form during this luncheon. Installation of new officers is set for the evening.

Ample booth space is still available for firms at the Engineering Progress Exposition, the New York group reported as the AMERICAN ENGINEER went to press. However, exhibitors were urged to make reservation this month if they hoped to be represented at this special Silver Anniversary meeting.

Franklin J. Johnson is serving as chairman of the 25th meeting committee, while Carl H. Reker is heading the State committee. George T. Baer and John J. Lanigan are vice chairmen. The New York State SPE is also holding its annual meeting in conjunction with the national get-together.

## 1959 NYSSPE Meeting Committee

Members of the NYSSPE Meeting Committee are shown, l.-r., seated: John Muller, budget director; George Baer, vice chairman of Exposition; Carl Reker, general chairman; John Lanigan, vice chairman of convention; Fred Caiola; standing: William Pressman; Sydney Kalver; Oscar Soyland; William Devine, secretary; John Marshall; Roger Billharz; Otto Rothman; Charles Blanchard, Jr., and John Kurucz.

## EDUCATION

*(Continued from page 28)*

who will be admitted to this program.

The purpose of the graduate professional engineering school curriculum will be to develop to the fullest possible extent the individual's abilities to apply creatively engineering and research methodologies. The development of the creative mind in engineering—for both professional practice and research—requires that it be given a freedom to span many fields before concentrating on one specialty. Under this plan, specialized knowledge in individual technologies will be acquired principally through post-graduate experience and training in industry where it can be done most effectively. Of course, some limited specialized training will be acquired in this professional curriculum through the students' work on design projects and research undertakings.

This proposed graduate professional engineering school would supplement the current educational patterns to increase the supply and quality of engineering personnel at the top levels of the profession. It would provide for educating the types of professional and research engineers who are really in short supply and who will contribute the levels of skill most urgently needed.—**End.**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***Now Available . . .***

**Standard Contract Forms Covering Engineer-Architect and Architect-Engineer Agreements**

Standard Forms of Agreement are now available after many years of effort by NSPE's Interprofessional Relations Committee to develop suitable contract documents for use when both architects and engineers are working jointly on a project. Six Forms have been prepared, three where the engineer is principal and three where the architect is principal. The documents are primarily guides and need not be used exactly as prepared.

*A complete kit with the set of six Forms plus explanatory material is available for $1. Additional copies of the individual Forms are available at the following rates: 1-25 copies, 20c each; 26-100 copies, 15c each, and over 100 copies, 10c each.*

**Agreement between Engineer and Architect on Percentage Basis . . . Form No. 2**

**Agreement between Engineer and Architect on Basis of a Multiple of Direct Personnel Expense . . . . . Form No. 3**

**Agreement between Engineer and Architect on Basis of a Professional Fee Plus Reimbursement of Expenses . . . . . Form No. 4**

**Agreement between Architect and Engineer on Percentage Basis . . . Form No. 5**

**Agreement between Architect and Engineer on Basis of a Multiple of Direct Personnel Expense . . . . . Form No. 6**

**Agreement between Architect and Engineer on Basis of a Professional Fee Plus Reimbursement of Expenses . . . . . Form No. 7**

**NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS**
**2029 K STREET, N. W., WASHINGTON 6, D. C.**

*Please send me the Engineer-Architect and Architect-Engineer Standard Forms of Agreement in the quantities indicated:*

Complete Set.....

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Form No. 4..... Form No. 7.....

TOTAL.....

I am enclosing $.....

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Street.....

City..... State.....

(Please make checks payable to: National Society of Professional Engineers)

# Alabama Society New Leader In NSPE Fund Raising Drive

## • Contributions Now Exceed $65,000 Mark
## • 'Ambassador' Will Be Announced at NYC

Alabama, stellar society member of the Deep South, leads all other NSPE state societies in the percentage of its members who have contributed to the voluntary fund raising drive. Further, in the contribution per member grouping it holds the number one position as well.

The Free State of Maryland, which was leading in the percentage of members contributing to the fund, has now dropped to number two in that category and to fifth place in the contribution per meming.

In determining the percentage of members contributing, a contribution by a state society on behalf of its members was considered only as a single contribution.

Society officials hailed the recent pick-up in the amount of contributions to the fund raising drive which was begun some months ago. The fund now stands in excess of $65,000 which will aid the NSPE in continuing programs this year that were threatened because of lack of funds.

**NSPE President Clark A. Dunn stressed the point that the fund drive is a continuing affair through 1959, and expressed the hope that those members who have not already contributed would do so in the very near future. It was again emphasized that the recently voted dues increase would not be effective until 1960, and, consequently, the Society faces serious financial problems for the remainder of 1959.**

The large number of NSPE members contributing to the campaign has been most impressive, according to Society officials. Other state societies, in addition to Alabama, have made rapid advances in the standings. When the previous standings were announced in January, Puerto Rico was in the eighth spot in the contribution per member listing. They are now second in this department and fourth in the percentage standings. Utah and Idaho are other societies which have shown considerable progress, while California continues to remain in the top five.

"Project Ambassador," which will send an engineer and his wife on an all expense paid tour overseas, was an integral part of the fund raising drive. Members contributing were asked to submit resumes which are being reviewed by a panel of distinguished judges. They will select the ambassador on the basis of the resume material. The man selected will be announced at the time of the annual meeting in New York City in June.

The judges selecting the "Project Ambassador" winner have a difficult task confronting them. Hundreds of excellent resumes were submitted and it's now a matter of carefully examining each one.

Judges for "Project Ambassador" are C. Y. Thomas, vice president, Spencer Chemical Co.; William F. Ryan, former vice president, Stone & Webster Engineering Corp., and A. A. Potter, dean emeritus of engineering, Purdue University.

Another unique feature of the campaign is the availability of a personalized desk name plate to all those who contribute $10 or more. The name plate is attractively designed, and the name of the contributor is printed in bold white letters, on a choice of gray, black or walnut background.

**VOLUNTARY FUND STANDINGS**

| | Contribution per Member | | | Per cent of Membership Contributing |
|---|---|---|---|---|
| 1 | Alabama | $3.17 | 1 Alabama | 27.4 |
| 2 | Puerto Rico | 2.67 | 2 Maryland | 24.2 |
| 3 | California | 2.56 | 3 Idaho | 23.5 |
| 4 | Utah | 2.51 | 4 Puerto Rico | 23.3 |
| 5 | Maryland | 2.43 | 5 California | 23.2 |
| 6 | North Carolina | 2.11 | 6 Canal Zone | 22.9 |
| 7 | South Dakota | 2.11 | 7 Utah | 21.4 |
| 8 | Mississippi | 2.05 | 8 Montana | 21.1 |
| 9 | Colorado | 2.01 | 9 North Carolina | 20.3 |
| 10 | Connecticut | 1.97 | 10 Connecticut | 19.9 |
| 11 | Canal Zone | 1.91 | 11 South Dakota | 19.8 |
| 12 | Nevada | 1.90 | 12 Wyoming | 19.4 |
| 13 | Massachusetts | 1.88 | 13 Illinois | 18.9 |
| 14 | Iowa | 1.87 | 14 Louisiana | 18.6 |
| 15 | North Dakota | 1.83 | 15 Nevada | 18.6 |
| 16 | Virginia | 1.83 | 16 Colorado | 18.4 |
| 17 | Idaho | 1.81 | 17 Washington | 18.3 |
| 18 | Louisiana | 1.81 | 18 Arizona | 17.9 |
| 19 | New Mexico | 1.81 | 19 Mississippi | 17.7 |
| 20 | Kansas | 1.79 | 20 Virginia | 17.4 |

## This Month's Authors . . .

Prof. Albrecht

Prof. Orel

Professors W. P. Albrecht and Harold Orel are again authors for an article in the AMERICAN ENGINEER. Both educators are well qualified to write on the timely topic of the engineer's report.

In addition to various teaching assignments, Prof. Albrecht has worked for Westinghouse Electric as a technical writer and editor. He is now professor of English and chairman of the Department of

English at the University of Kansas.

Prof. Orel has also served as a technical editor for the General Electric Company, and is familiar with the work of engineers and scientists. He is an associate professor in the Department of English at KU.

△ △ △

Mr. Ludwig

John T. Ludwig is senior research and development engineer for the Minneapolis-Honeywell Regulator Company. He received his Bachelor's degree in electrical engineering from the University of Minnesota in 1948, and has also acquired a Master's degree and Ph.D. from the same school.

Active in several professional organizations, Mr. Ludwig is currently serving on NSPE's Engineers-in-Industry Subcommittee and the Committee on Engineering Technicians. He is also a past president of the Minnesota Society's Engineers-in-Industry Section and a past chairman of their Constitution and Bylaws Committee. His other affiliations include the Institute of Radio Engineers, Eta Kappa Nu, AIEE, and the Honeywell Engineers' Club of which he is a past president.

△ △ △

Dean Barish

Norman N. Barish is associate dean of the College of Engineering at New York University. He holds a B.S. degree in economics from the City College of New York as well as a B.S. in mechanical engineering from the University of Michigan. He received a Master's degree in mechanical engineering from the University of Pennsylvania.

Dean Barish has been at NYU since 1947 serving successively as assistant professor, associate professor and professor of management engineering; chairman of Industrial and Engineering Management Department since 1955; secretary of the College of Engineering 1948-1958, and acting dean of the College of Engineering 1957-58.

He holds memberships in a number of professional organizations including ASME, ASEE, and AIIE. He is the author of several books plus numerous articles in technical and business journals.

## Thoughts on Professionalism...

By PAUL H. ROBBINS, P.E.
*NSPE Executive Director*

### *Year 'Round Public Relations*

REPORTS coming to national headquarters indicate that National Engineers' Week this year was more extensive and more elaborate than any Engineers' Week effort previously. This activity of the National Society undoubtedly produces the greatest amount of publicity for a minimum of expense of any public relations activity in which the Society could engage.

OCCASIONALLY, question is raised as to the real meaning of Engineers' Week. The magazine of the Engineering Department of the Du Pont Company, known as *du Pont Engineering News,* carried the following editorial as to objectives which underlie this public relations activity and philosophies which should undergird all of the Society's activities during National Engineers' Week and its entire public relations effort:

> Annual "weeks" and "days" have become such a recurring part of American life that their significance is diluted by their frequency. Most of those we're familiar with are frankly commercial promotions, designed to stagger the customer with the charms of doughnuts or arch supports.
>
> Why, then, a National Engineers' Week? What does the NSPE have to sell? Why should this annual celebration carry more weight than outwardly similar merchandising promotions?
>
> The answer, of course, is in the nature—the aim—of the week-long program. There's nothing to sell here; nobody is being urged to "rush right out and buy more engineering," no jackpots are awarded for following the promoters' instructions. The only benefit Engineers' Week brings to the people of the country is education—a promise of progress when they place the importance of engineering in the proper perspective.
>
> Engineers' Week is the occasion for an intensified, cooperative effort to inform the nation of the significance of the profession. The hope is that increased public knowledge will encourage more promising students to choose careers in technology, and awaken in all of us the realization that today's world demands greater comprehension of technical problems and advances. The public as a whole is slowly becoming aware of its stake in engineering, but apathy toward and often suspicion of technological improvements in our work and military strength can slow the forward motion of industry as well as national defense.

WITH the tremendous effort by all the chapters, state societies, and cooperating organizations on Engineers' Week, there may be an unfortunate tendency to feel this is a sufficient public relations effort for the year. With the increasing responsibilities with which the profession is faced, the better understanding of both engineers and their work, which is so effectively accomplished during Engineers' Week, should only be the keystone on which a year-'round public relations effort on the part of the profession can be built.

IT is encouraging to receive reports from many chapters and state societies of the continuing opportunities for effective public relations opened up by the initial impetus created during Engineers' Week. Unforunately, the responsibilities of the profession cannot be condensed into one week's time—they continue year 'round. All engineers should be alert to the opportunities that may be presented to them as the result of interest in the engineering profession during Engineers' Week.

## UNITY

*(Continued from page 30)*

been most successful. While there are always certain differences inherent in professions, nevertheless, we no doubt can profit much by a study of the American Medical Association (AMA) and the American Bar Association (ABA).

An analysis of these professions immediately reveals the close similarity of their organizational structure as well as the nature of their activities and their objectives. Such a study also clearly points out the fundamental requirements for effectively meeting the needs of a professional group. The following fundamentals stand out prominently:

1. There must be provisions for adequately and effectively caring for the professional matters which are the common denominator problems of all those engaged in all branches of the profession.

2. Professional development requires a grass-roots organization having individual members in whose hands is vested complete democratic control.

3. Professional development requires strong organizations at the local, state and national levels having well-established, direct lines of communication and representative control of policy.

4. There must be a mechanism of coordinating the technical activities of *societies.*

5. There must be the mechanism for effectively controlling educational standards.

6. There must be adequate means of communication so that the needs and ideas of the various founder and technical societies may be given proper recognition by the groups who are working in the professional, technical and educational areas.

7. There must be adequate finances available to fully serve the needs of the profession.

8. There must be acceptance of the necessity of the profession being built on a solid foundation which recognizes that all of its members must ultimately be licensed to practice.

If we want to be as successful as AMA and ABA, then we had better follow the principles they have so clearly and so successfully demonstrated. Certainly the principles which have been so successfully proven by two of our eminent sister professions should be given due consideration by the engineering profession in its efforts to establish corresponding objectives.

An analysis of our own unity efforts and studies only serves to emphasize the eight basic principles previously stated.

The Functional Plan meets all of these requirements—ECPD provides requirement 5, EJC provides requirement 4, NSPE provides requirements 1, 2, 3 and 8. Requirement 7 is provided in the finances available to each of the three organizations. Means are available in each of the organizations for meeting requirement 6.

### The Federation Concept

Over the years there has been considerable agitation to attain unifying coordination in our profession through a federation of societies. There have been several attempts along this line, but when we analyze the problem in its entirety and consider the fundamentals required to realize our objectives—the fundamentals which have been so clearly established not only by trial and error in our own efforts but also by the successful efforts of the medical and legal professions—it is obvious why our past attempts along the federation concept have failed.

Federations of societies by themselves have demonstrated that they cannot fulfill the *professional* category of needs of the engineering profession because they *do not:*

1. Provide a grass-roots organization having individual members in whose hands is vested complete democratic control.

2. Provide an effective organization at the local, state and national levels with well-established lines of communication and representative control of policy.

3. Provide a continuing, sound financial foundation with a budget adequate to satisfy the needs of the profession. (To successfully represent the engineering profession in professional matters alone would require a budget of many times the total income of EJC today. It is a well-known fact that its constituent societies are not in a position to make contributions to it of this magnitude—see *Engineering News-Record,* November 27, 1958, page 17.)

4. Provide for membership standards essential for the legal recognition for professional status (registration) which is so necessary for a solid foundation on which to build a unified profession.

By now it should be crystal clear to the engineering profession that an enduring unity organization must be more than a federation of societies—much more! The combination of the federations of EJC and ECPD and the grass-roots membership society of NSPE can provide the necessary basic principles. The Functional Plan is an extremely important first step in the coordination of the existing organizations which will permit orderly evolution of the profession into a sound, lasting, effective and unified organization in a simple, workable and practical manner.

### Registration and Unity

In our unity considerations, we must recognize that there is one fundamental principle that the medical and legal professions have definitely established—the one criteria that gives them full legal and public recognition as a profession and to a great extent is the prime basis of unity in those professions—that one fundamental principle is *universal acceptance of registration.*

The engineer renders a service just as the doctor or lawyer, but we differ in one most important respect from these two professions—universal acceptance of registration. This applies equally to all individual members of all three professions whether they be employed in private practice, by industry, as public servants or in any other capacity. Every engineer, just as the doctor or the lawyer, has an obligation to the profession, to himself, to his employer and to the public to become registered. When this fundamental principle is accepted, we will have built a solid foundation for a true engineering profession—we will have established the common tie that produces unity. There should certainly be this much professional pride.

It becomes apparent that we need to establish a firm foundation for the profession itself through acceptance of registration. Through the years we have been endeavoring to build the roof before we have completed the foundation. We have already found this cannot be done. Also, the other professions have shown us that before the desired unity can be attained there must be a common tie—that one thing that is common to *all* engineers—to bind them together. They have also shown us that this one thing is licensing of all members of the profession.

This was well summarized by NSPE Past President T. C. Forrest, Jr., speaking before the American Society of Civil Engineers, as follows: "We can prepare organizational charts of all kinds and we can set up machinery, but until we have developed a professional pride in the engineer and a consciousness of his responsibility to the profession, any unity organization will be without the necessary heart throb and soul necessary to weld it into an instrumentality that all individual engineers will feel a responsibility in connection therewith."

This viewpoint reveals one of the basic causes of the failure of our unity efforts to date. There has been much wishful thinking. We have become thoroughly confused by trying to take short cuts. We have tried to build on an insecure foundation. It is apparent that we must take steps to strengthen this foundation. Since this is a professional problem, it should be spearheaded by the professional society with the very close cooperation of all engineering societies.

### The Functional Plan Will Work

The Functional Plan has stirred the imagination of the entire engineering profession as a feasible, practical, workable procedure for accomplishing more effective action on the technical, educational and professional problems of the engineering profession. The American Institute of Electrical Engineers (AIEE), which first proposed the Functional Plan, has given much time and thought to the *practical* problem affecting unity in the profession, as well as to the objectives of unity. It has reviewed the successes and failures of past attempts, not only of our own profession but of other professions. It has reviewed the problems from the viewpoint of a realist, taking into full consideration conditions as they exist today. The result has been the proposing of a practical plan of coordination within the profession as a first step towards an organization that will meet the fundamental requirements which have been so clearly established in the past as necessary for unity in the engineering profession.

The Functional Plan has a strong appeal to the individual engineer as evidenced by the reaction of the members of the three largest engineering societies in the country today; namely, AIEE, ASME and NSPE, these being the societies which have made an extensive effort to inform their membership on the proposal.

We need to quickly establish a sound organization in the profession such as that provided by the Functional Plan. This will accomplish two objectives: First, it will help in building the strong profession needed for *true* unity; and secondly, it will now provide the most efficient type of organization for the successful operation and continuing advancement of the profession.

In presenting the Functional Plan, AIEE made it clear that it was not being proposed as an ultimate unity organization but only as a step in that direction. It organizes the profession as we would organize our own business, into a coordinated, efficient operation based on the fundamentals learned from the past, as well as from the principles of specialization. It utilizes to the fullest advantage the going concerns we have today. If this can be accomplished, it is strongly believed that the ultimate unity organization will then develop in an orderly fashion. Too often in the past we have tried to effect an ultimate unity organization all in one great sweep instead of trying to build such an organization step by step from the ground up. Of all people, engineers should know that any structure must start with the foundation and that it is built a piece at a time until completed. True unity must come from evolution—not from revolution.

We do not need any more organizations to effect unity; all we need to do is to better organize, fully utilize and support the ones we have. It is believed that the several technical societies, the EJC, the ECPD, and the NSPE *can* work together in the areas outlined by the Functional Plan.

Too often in the past considerations of and decisions relating to such subjects as this have been by others than the engineering memberships themselves. Such discussions have been both enlightening and helpful. However, decisions on such vital matters affecting all of the profession should be made by the engineers themselves. Only in this way will we ever establish strong and enduring unified action, because only in this way will it be supported by those who must support it—the individual engineers.—**End.**

## BALLOTING

*(Continued from page 35)*

members as national directors without requiring any financial underwriting on their part to participate in this important policy making body. This money would be used for this purpose.

• ***Additional Staff.*** NSPE still operates with the lowest per member ratio of staff of any major professional society. These funds would be used to increase the Washington headquarters staff so it could operate more efficiently.

• ***Chapter Handbook.*** Chapter Handbook was prepared originally and distributed in 1950. New handbooks must now be sent to the state chapters.

The official report of the Tellers' Committee, headed by Wallace Barlowe, shows the final vote count to be as follows:

For President: Harold A. Mosher —9,723; For Vice President: W. Earl Christian—9,548; R. King Rouse—9,442; L. E. Easley—9,476; Brandon H. Backlund—9,483; Noah E. Hull —9,504; George E. Zelhart—9,450, and For Treasurer: Russell B. Allen —9,672.

Constitutional amendment to allow a dues increase. For: 6,142; Against: 2,787.

By Mrs. Garvin H. Dyer, Chairman of the Ladies Auxiliary Advisory Committee.

---

**We are happy to announce the** forming of another new auxiliary. The Essex County Chapter of New Jersey met in an organizational meeting in February at the home of Mrs. Carl Kastner of Maplewood. A constitution and bylaws were adopted and officers elected. It was decided to have five yearly meetings. Forty members attended and Mrs. Carl Kastner was elected president.

**The DuKane Auxiliary of Aurora, Illinois,** are very busy planning for the entertainment of the ladies attending the annual meeting of the Illinois SPE, April 30, May 1-2. They have recently installed new officers and report a very active auxiliary. In order to vary their programs they have a different program chairman each meeting.

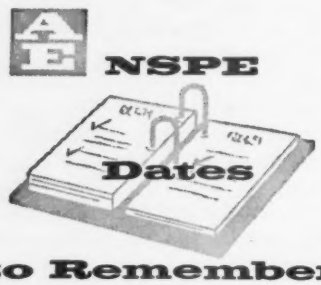
**A beautiful Ladies Auxiliary Insignia is now available from national headquarters designed as a charm as well as a pin. The price is $5. An order form for securing this Insignia will be carried in next month's issue of the American Engineer.**

**The El Paso, Texas, Auxiliary** recently installed Mrs. John P. Foster as president at a luncheon at the Patio Verde.

**The Topeka, Kansas, Auxiliary** have amended their bylaws to provide new officers assuming duties the first of September instead of January. Topeka has a large, very active auxiliary. They alternate luncheon and dinner meetings for maximum benefit to their large membership. In January they voted to set up a scholarship fund of $100 for an engineering student.

**The Wives of Professional Engineers** of the Erie Chapter, Pennsylvania SPE, held a white elephant sale at their February meeting. They have recently compiled a yearbook containing a roster of their own members and a roster of the Erie Chapter members, including the business connection of each member. The proceeds from the white elephant sale helped pay for printing the yearbooks. In March, the Auxiliary had a speaker on "World Affairs" and at the April meeting they had a speaker from the Chamber of Commerce—Better Business Bureau.

**Reports from South Carolina in-**




## to Remember

**NSPE State Presidents' Conference**—April 3-4, 1959, Memorial Union, Purdue University, Lafayette, Indiana.

**Wisconsin Society of Professional Engineers**—Annual Meeting, April 10-11, 1959, Schroeder Hotel, Milwaukee, Wisconsin.

**Florida Engineering Society**—Annual Meeting, April 22-25, 1959, Robert Meyer Hotel, Jacksonville, Florida.

**Illinois Society of Professional Engineers**—Annual Meeting, April 30-May 2, 1959, Rockford, Illinois.

**New Jersey Society of Professional Engineers**—Annual Meeting, May 1-2, 1959, Ambassador Hotel, Atlantic City, New Jersey.

**Maryland Society of Professional Engineers**—Annual Meeting, May 12, 1959, Friendship Airport, Baltimore, Maryland.

**Pennsylvania Society of Professional Engineers** — Annual Meeting, May 14-16, 1959, George Washington Hotel, Washington, Pennsylvania.

**California Society of Professional Engineers**—Annual Meeting, May 15-16, 1959, Awanhee Hotel, Yosemite, California.

**Connecticut Society of Professional Engineers**—Annual Meeting, May 16, 1959, Waverly Inn, Cheshire, Connecticut.

**Montana Society of Engineers**—Annual Meeting, May 23, 1959, Finlon Hotel, Butte, Montana.

**District of Columbia Society of Professional Engineers** — Annual Meeting May 25, 1959, Presidential Arms, Washington, D.C.

**National Society of Professional Engineers**—Annual Meeting, June 17-20, 1959, Commodore Hotel, New York, New York.

**National Society of Professional Engineers**—Fall Meeting, October 15-17, 1959, Penn-Sheraton Hotel, Pittsburgh, Pennsylvania.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dicate that all their auxiliaries are having a very active and interesting year. The Piedmont Auxiliary is trying a new plan this year—to have four meetings, with each to have a special significance. This plan was developed at a membership tea. The Chapter and Auxiliary were joint hosts, with the Auxiliary in charge of all arrangements. Formal invitations were sent to all engineers in the area eligible for membership, as well as their wives. Response was so gratifying and the occasion so enjoyable that it will become an annual affair.

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Drilling Services
Foundation Investigations, Test Boring
Grout Hole Drilling and Pressure Grouting
Diamond Core Drilling
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**PENNSYLVANIA DRILLING COMPANY**
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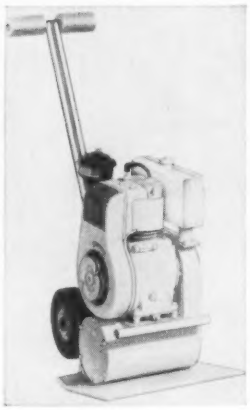
# Progress in Products

## TAMPER — Item 30

Compact and powerful, the J-18 delivers three times the tamping power of the J-12. New shoe design and weight ratio, plus improved telescoping shock mounted handle allow this tamper to work harder, faster and with greater operator comfort than ever before, the manufacturer states. The J-18 is powered by a BKN Wisconsin 4.6 H.P. air cooled engine and is equipped with the Jay carburetor. Travel speeds range from 30 to 60 feet per minute depending on thickness of lift and type of material to be compacted.

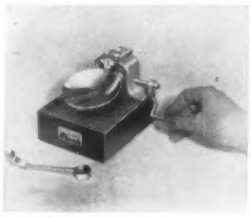


## SAFETY CLOTH — Item 31

Development of a new lint-free, non-fraying asbestos safety cloth, which is claimed to have greater abrasion resistance than plain asbestos cloth, has been announced by the Union Asbestos and Rubber Co. All of these advantages, says UNARCO, have been added to its new asbestos fabric while maintaining the same insulation characteristics of plain asbestos cloth. Unlike plain asbestos cloth, the new fabric does not unravel along cut edges and can be tailored to fit any pattern. The new cloth is available in standard widths of 36″ and 40″, but can be furnished in widths of up to 60″.

## LIQUID LIMIT TESTER — Item 32

A liquid limit testing machine for performing classification tests on soils has been announced. New molding and extrusion manufacturing techniques make uniformity of parts possible. This results in better correlation of test results performed on the new machine in laboratories around the world. All control parts are extruded through precision dies. The hard rubber base is formed in a mold to maintain uniformity of hardness, size and density on all devices.



## POCKET DRAWING KIT — Item 33

Alvin & Company, Inc., announces an all-around basic Drawing Kit priced with a budget in mind. The kit contains the two basic instruments necessary for layouts and measuring. Full 6″ Bow Compass and 5½″ Friction Divider are sturdily constructed with polished nickel finishes. Both instruments and spare parts tube with an extra divider needle come in an attractive vinyl plastic case with black satin finish. This 6¼″ x 3½″ case is fitted with pocket flap.

## NARROW-AISLE TRUCK — Item 34

Capable of transporting and stacking 3000 lb. loads up to 16 feet wide in storage aisles no more than 8-feet wide by traveling sideways, this narrow-aisle truck also tiers conventionally in 6-foot aisles. It is spark-enclosed to permit operation in hazardous areas. An auxiliary lift of 18 inches is also incorporated for ceiling-high stacking with minimum collapsed height. The over-all design retains all of the operating and maintenance conveniences associated with standard Raymond narrow-aisle trucks.

## MICROFILM — Item 35

A new 35mm Microfile Print Film, recently announced by Eastman Kodak Co., markedly improves the quality of positive film duplicates of original microfilm negatives. In engineering drawing work the new film is expected to widen the use of aperture card systems for reproducing and distributing engineering drawings in industry and government. For the first time, resolution of the new positive film matches the potential of the 240 lines per millimeter of original Kodak microfilm negative, it is claimed.

## DRAFTING TABLE — Item 36

A drafting table that literally floats into any position, and holds without wobbling, has been announced. The adjustable table is balanced perfectly in any position by a counterweight mechanism, operated by foot pedals. Its large range of movement permits the draftsman to work comfortably on any part of the board, standing up or sitting down. A multi-disc friction device locks and unlocks the board to make height and slope simultaneously adjustable.

## ROOFING — Item 37

A line of aluminum roofing and siding accessories is being marketed by Kaiser Aluminum & Chemical Sales, Inc. The products are embossed in a diamond pattern to match the company's Diamond-Rib building sheet. In addition to diamond embossed, ribbed sheets measuring 6 to 16 feet in length, and aluminum nails with embossed heads to match, the Diamond-Rib family of building products now includes: 1) ridge roll, 2) formed ridge cap, 3) endwall flashing, 4) green tinted translucent panels, and 5) coil flashing in 50 lineal foot rolls up to 48 inches wide.

**This column describes new products of general interest to professional engineers. For further information, circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.**

***These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.***

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